

## **LAND USE PLANS**

## **RESIDENTIAL DEVELOPMENT PLAN**

### **INTRODUCTION**

The eastern portion of Loudoun County has experienced major residential and non-residential development in the last two decades, growing from a rural farming area to a major suburban community with just over 7,500 dwelling units. Current projections for 1990 suggest that new residential building will double the number of existing housing units to 15,000. The planning challenge for the coming decade is to provide a framework for this growth so that new communities will integrate harmoniously with the natural environment and with existing development.

To meet this challenge the Eastern Loudoun Area Plan calls for additional development criteria in the review of new residential development proposals. Zoning density will certainly remain an importance factor in this review which will also include factors such as:

1. Environmental considerations such as floodplains and hydrological systems, steep slopes and topographic features of note, significant vegetation, etc.
2. Transportation including availability, the need and cost of attendant improvements, the feasibility of transit and transport alternatives.
3. The inclusion of usable, quality open space and evidence of good community design.
4. Energy efficiency through appropriate site development, house placement and orientation.
5. The financial impact of this development on County fiscal resources and the substance of development proffers.
6. Compliance of proposals with provisions of the Resource Management Plan.

Eastern Loudoun has a basic complement of public services: sewer and water, roads and highways, elementary, middle and high schools. Individuals and families have moved into this suburbanizing area of the County not only to take advantage of the nearby open space and lower taxes, but also for a sense of community within close proximity to the Washington Metropolitan Area.

The residential element of the Eastern Loudoun Area Plan opens with a section on the goals and policies designed to give direction to the independent and multiple actions which together will form the basis for future communities in eastern Loudoun. The residential element's objective is to manage residential development in a manner which is as socially humane, environmentally sound, aesthetically pleasing and financially affordable as possible.

## POLICIES

The goals and policies of the residential section are designed to provide overall direction in the design of residential development in a manner more specific than that of the Resource Management Plan. The RMP's goals and policies have the objective of preserving the unique character of Loudoun County as a whole.

### A. Goals

#### 1. Resource Management Plan:

This plan adopts those County-wide goals included in the Resource Management Plan, in particular those identified on pages 193 through 198 that speak to residential development.

#### 2. Community Identity:

It is the particular goal of this plan to encourage the development in eastern Loudoun of identifiable communities possessing a full range of affordable housing types with the complete spectrum of community facilities.

#### 3. Growth Management:

It is furthermore the goal of this plan to manage the location and timing of this residential growth to coincide with the orderly construction of public facilities in order to maximize public use and benefits, to minimize undesirable waste, and to reduce negative social, environmental and fiscal impacts.

### B. Policies

To achieve these goals through the next 5-10 years, the County will adopt certain policies and land management techniques. Such policies will include those outlined in the Resource Management Plan particularly those on pages 218 through 231 in the "Community" and "Potential Community" sections. In addition, the County will adopt the following policies:

#### 1. Reasonable Use and Conditional Zoning:

To establish a reasonable use for a specific property subject to a rezoning application in terms of existing social, environmental and fiscal considerations, and to review this use in the light of significant social, environmental and fiscal proffers volunteered by the applicants.

2. Housing Type Variety:

To encourage the provision of a wide range of housing types within each community and to actively seek the provision of such housing which it deems to be underprovided.

3. Design:

To employ design standards that foster both a physical and social sense of community and that recognize the specific environmental qualities of a site.

4. Growth Policy:

To accept and manage residential development in eastern Loudoun in a manner which is a socially humane, environmentally sound, aesthetically pleasing and financially affordable as possible.

5. Cooperative Planning:

To coordinate planning decisions with Fairfax County and the Town of Herndon in order to promote uniformity of land use decisions and programs.

EXISTING CONDITIONS

A. Existing Planned Residential Development:

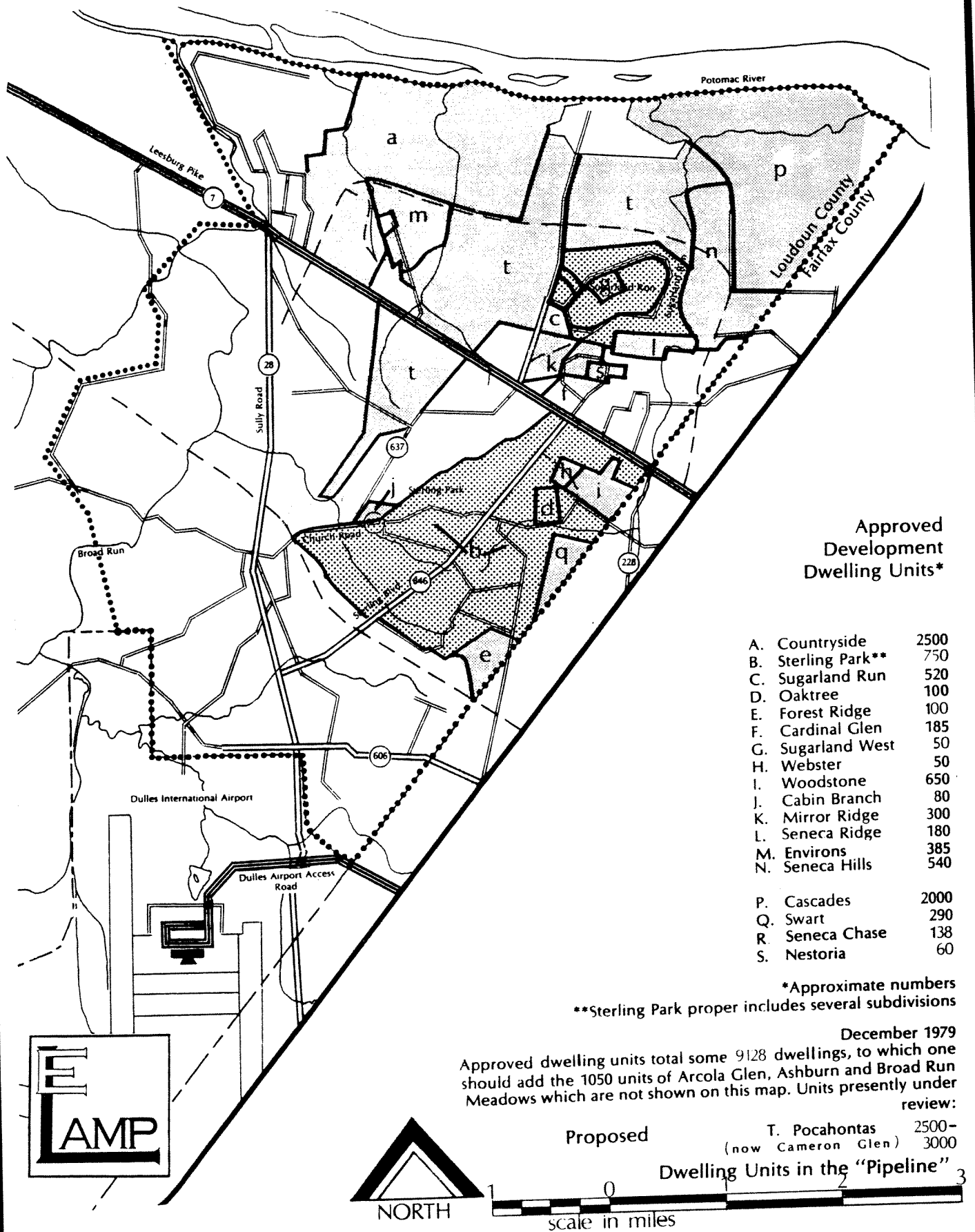
The historic land use pattern in eastern Loudoun County was one of farmland. Prior to 1960, only a few hundred houses had been built in the area, with new units mainly confined to Broad Run Farms, Richland Acres, Old Sterling and Oak Grove.

The construction of Dulles Airport and a major interceptor sewer leading to the Blue Plains Treatment Plant altered the existing situation greatly, permitting the creation of the Sterling Park and Sugarland Run communities and their satellites. (See Figure 1, page 21, for residential developments).

1. Sterling Park: Total Units 4,000+      80% developed

Sterling park was rezoned and designed in the early 1960's as a "planned community" comprising single and multi-family residential areas, dedicated school sites, a commercial center, and reserved church locations. The design orients toward the collector road of Sterling Boulevard which terminates at Route 7 on the north and Route 28 to the south. The original design called for the creation of a major commercial center midway along Sterling Boulevard, a concept which has been hampered both by design

Figure 1



problems and by subsequent commercial rezonings on Route 7. A valuable feature of the street layout of Sterling Park was the conscious "open ended" design of the roadway system. This permitted additional growth of the community and facilitated cross community movement, particularly important for emergency vehicles.

Lot sizes in Sterling Park range from 8,000 to 13,000 square feet for single family housing and 1,600 to 2,000 square feet for townhouses and multifamily units. Generally, lot sizes for single family units have increased in later additions to the original development. This is reflected in the overall density pattern of three to four units per acre in the older sections and one to three units per acre density in the more recent subdivisions such as Forest Ridge and Spring Grove.

Sterling Park represents a competent example of that type of suburban community development associated first with the firm of Levitt and Sons on Long Island. Major collector roads, school, church, commercial and industrial sites form integral parts of an overall community design. Sterling Park has provided the County with an appreciable range of family housing types from small 3 bedroom 1 1/2 story Cape Cods, to large two story Colonials, small and large semi-detached houses, townhouses and apartments.

Unfortunately Sterling Park is not an unqualified success. The major collector road connection of Sterling Boulevard and Route 7 has proved to be a problem. The traffic difficulties have been compounded by the accretion of satellite communities. Further, the stereotyped design of suburban roads with equally spaced dwellings has created a monotony readily apparent from the Route 7 and Sterling Boulevard entrance. The lack of usable public open space is a real community hardship. This need has generated intense local efforts to find alternative recreational space. However, a balanced evaluation of Sterling Park must rate the development highly in the context of its time. Loudoun lacked sophisticated planning controls and could neither evaluate nor monitor a complex Planned Unit Development. U.S. Steel for its part was a responsible developer and provided those facilities recommended by the "state of the art" at that time. In addition, U.S. Steel faithfully complied with a financial proffer towards the County's capital expenses which has not been equalled in 20 years.

2. Sugarland Run: Total Units: 1,875 100% developed

Designed 10 years after Sterling Park, Sugarland Run attempted to correct some of its predecessor's perceived shortcomings. The design featured a closed loop road, Sugarland Run Drive, bordered by a rich variety of housing types and community facilities. Cul-de-sac roads and shorter loops branch off the Drive and create pleasant neighborhood groupings with an overall density of 4 units per acre. Lot sizes in Sugarland

range from 8,000 to 11,000 square feet in the single family neighborhoods and 1,600 to 2,000 square feet in the townhouse sections. In contrast with Sterling Park, lot sizes have remained stable in later additions to Sugarland Run such as Seneca Ridge. Actual density, however, has decreased and maintenance of community open space is a result of use of the Zoning Ordinance's cluster provisions.

Sugarland Run must be rated an architectural success for Loudoun. A very large and dense community with a population equal to Leesburg's was created under unified artistic direction, and this harmony is the key to Sugarland Run's success in concealing its actual density. However, the design is not without problems. The policy of self containment has created access problems both into Sugarland Run itself from Route 637 and from the community to the contiguous properties of Freid, Libby, Nestor, Barrazotto and the Seneca Ridge Middle School. The design of tight residential clusters adjacent to other tight clusters has contributed to a lack of recreational opportunities, particularly for the young. This lack of open space buffering is felt most acutely around the commercial/institutional area. Unfortunately, neither the poor access nor the lack of "breathing room" can be adjusted easily at this time.

3. CountrySide: Total Units 2,500 0% developed

In the process of settling the CountrySide rezoning, Loudoun County approved in general concept an additional planned community which promises to combine features of both Sterling Park and Sugarland Run. The effectiveness of the transportation design of CountrySide will hinge on the eventual completion of the Route 28 loop road both to the southwest and northeast. In the meantime, the community will depend on a boulevard with access onto Route 7. Interest in the CountrySide scheme lies not so much on the roads, sidewalks, sewers, etc., but on the design's use of swales, streambeds and vegetation clusters to separate small sub-communities of 100 to 200 units. These mini-greenbelts form an overall network and are to function as the pedestrian movement channels through the development to the schools, shopping and community facilities.

B. Summary of Residential Characteristics:

1. Housing Types:

Sterling Park and Sugarland Run were both designed with significant areas set aside for garden apartments and townhouses and were initially considered prime areas for rental housing. However, regional economic trends have both discouraged the development of rental units and have lead to the conversion of the available rental units to condominium type units. Table 1 shows the pattern of housing types now in place in eastern Loudoun.

<b>TABLE 1</b> <b>HOUSING UNITS BY TYPE, February 1979</b> <b>EASTERN LOUDOUN</b>				
	<b>Single Family</b>	<b>Townhouse</b>	<b>Renter/owner Occupied Multi-family</b>	<b>Total Units</b>
Sugarland Run	947	719	193	1,859
Sterling Park	3,351	749	126	4,226
Richland Acres	51			51
Broad Run Farms	240			240
<b>TOTAL</b>	4,589 (72%)	1,468 (23%)	319 (5%)	6,376 (100%)

These 6,400 units house nearly 40% of the County's residents.

The recent conversion of 418 multi-family apartment and townhouse units into condominiums has led to a decided shortage of rental housing in eastern Loudoun. Vacancy rates in existing rentals are minimal and monthly rentals are at a premium.<sup>1</sup> Planning efforts will be expended to correct this deficiency.

## 2. Housing Costs:

The need for additional rental units is underscored by the relatively high cost of housing in the area, which currently exceeds \$72,400 for the average new single-family detached house and \$55,000 for the average new townhouse. Very few sales are made below \$40,000 and an increasing number of houses are selling in the \$90,000 - \$110,000 range. Based on an estimated median family income of approximately \$20,000 a majority of Loudoun County's current residents could not afford to buy any of the new single-family houses now being constructed. Furthermore, households with incomes less than \$16,000 - \$18,000 per year cannot afford to purchase any housing in Sterling Park or Sugarland Run. In this situation, the condominium conversions, such as Pembroke, are both an asset and a liability. The conversions permit families with moderate incomes to purchase some housing and gain the tax advantages and inflation hedge which home ownership brings. However, the conversion also reduces the stock of short-term housing accommodation which every community needs for families in transition, newly formed families and the elderly, blue collar workers and county employees. The County will seek to redress any shortage of housing options for moderate income residents both in the rental and home ownership sector.

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<sup>1</sup> Rental range: \$300 to \$450 per month, exclusive of utilities.

3. Magnitude and Location of Proposed Residential Development:

The County in recent years has approved rezoning applications which will permit the addition of 8,000 - 9,000 residential units to the area and which will more than double the current population. Figure 1, page 23 illustrates developed and proposed areas of eastern Loudoun. Table 2 shows the magnitude of growth which would be permitted by existing zoning patterns in eastern Loudoun. By 1985, the planning area could have over 6,000 additional units and 18,000 more people. Further development of land such as the Pocahontas property, could push the unit count well over 15,000 by 1990, resulting in a population of approximately 50,000. Table 2 indicates the potential development magnitude afforded by the existing zoning and subdivision approvals. These figures are entirely dependent upon the economy and its ability to promote new residential construction.

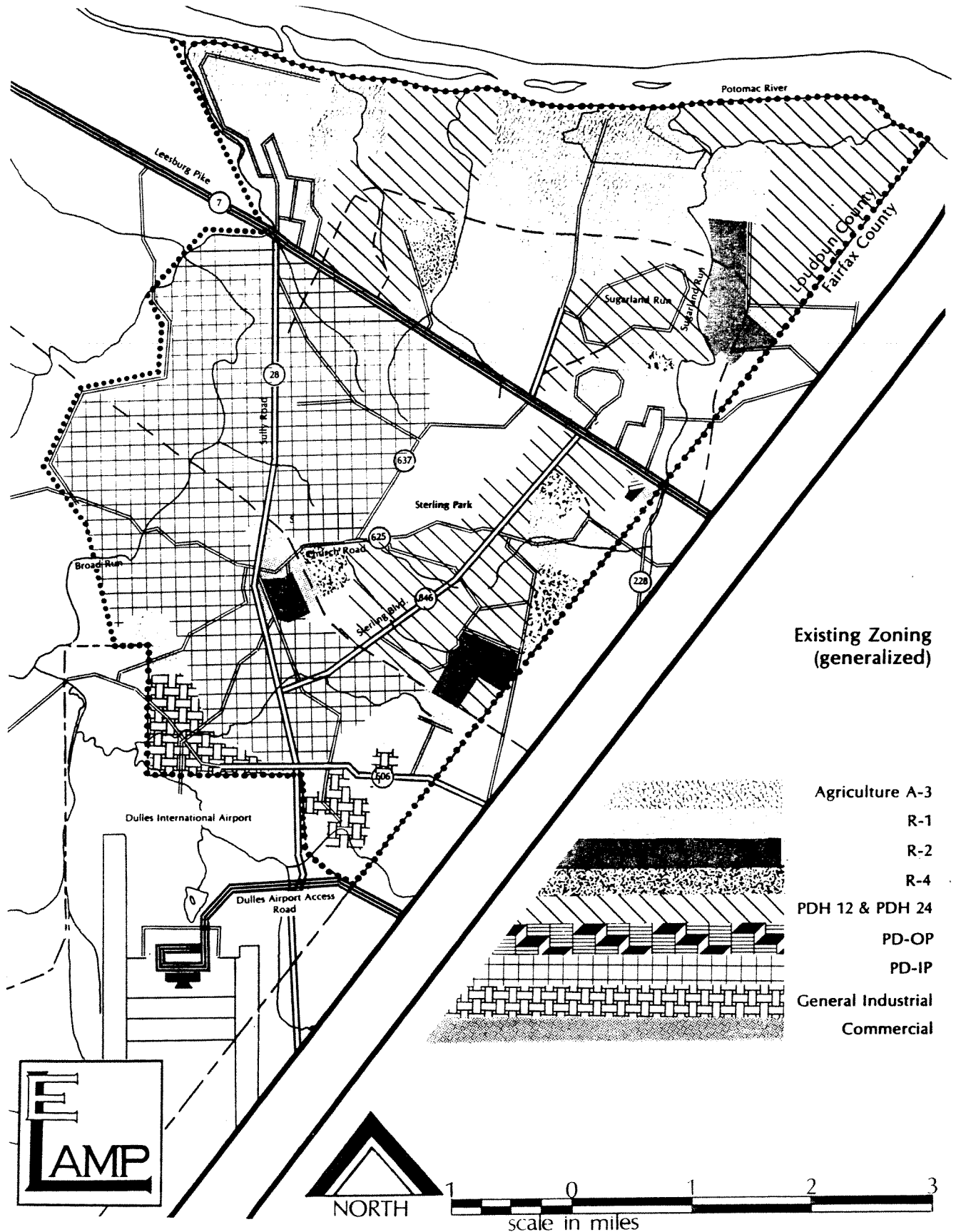
<b>TABLE 2*</b>									
<b>HOUSEHOLD FORECAST EASTERN LOUDOUN PLANNING AREAS</b>									
<b>Planning Area</b>	<b>Feb. 1979</b>	<b>1979</b>	<b>1980</b>	<b>1981</b>	<b>1982</b>	<b>1983</b>	<b>1984</b>	<b>1985</b>	<b>1990</b>
North of Route 7	2,041	2,555	3,021	3,684	4,687	5,431	6,026	6,564	8,251
South of Route 7	4,226	4,802	5,159	5,429	5,699	5,879	5,879	5,879	6,269
Route 28 Corridor Sub-total	144	144	144	192	240	288	336	369	369
All Units									
Total Units	6,411	7,501	8,324	9,305	10,626	11,598	12,241	12,812	14,889

\* Loudoun County Planning Department Statistics. Extrapolated from building permit data.

4. Zoning Patterns:

Figure 2, page 26, illustrates the current housing related zoning pattern in eastern Loudoun. The area north of Route 7 is currently zoned for three planned communities, Sugarland Run, Cascades and Countryside, and two R-1 subdivisions, Broad Run Farms and Richland Acres. The remainder of the vacant property north of Route 7 is zoned R-1 or A-3, including more than 1,000 acres of the Pocahontas (Cascades) property located between Sugarland Run and CountrySide. Realism dictates that agriculture cannot be considered an appropriate use of the Pocahontas (Cascades) property, and the County expects an application for rezoning within the next year.

Figure 2



South of Route 7, most of the area is zoned PD-H 12 for the Sterling Park planned community. On the periphery of Sterling Park, land is zoned for planned townhouse development south of Herndon Junction, adjacent to the Oak Grove community. A 37 acre site is zoned for mid-rise, multi-family development just east of the Sterling Community Center. R-1 zoned property is also located on both sides of Route 606, where it is interspersed with industrial development, and along the east side of Route 28, south of Route 606 around the Chantilly quarries. With the exception of the community of Oak Grove, which is composed of approximately 30 single-family homes, this land is only partially developed with a few house sites. Much of this R-1 zoning is residual and represents land use decisions which, in some cases predate the construction of Dulles Airport. Years of largely light industrial rezoning has rendered the classification of certain of these uninhabited, residentially zoned tracts inappropriate. The County anticipates that rezoning applications for industrial and office park uses will gradually remove these land use anomalies. The old Sterling area of eastern Loudoun is also characterized by a mix of residential (R-2 and R-4) and commercially (C-1) zoned properties. Old Sterling is bounded by Route 28, to the west, the W&OD right-of-way and the old Chessie right-of-way to the north. Evidence of a renewed vitality in the area presents the County with an opportunity to encourage, monitor and evaluate the development of mixed use growth.

5. Residential Development Patterns:

Loudoun County outlined a policy of managed community growth in the Resource Management Plan, pages 227-231, "Community" and "Potential Community Resource Management Areas" and specifically outlined the character of future residential development on page 229, #2.

"A moderate amount of additional population should be accommodated within the Community Development Areas. Specific locations and housing densities will be established by the planning area studies which shall be adopted as part of the Comprehensive Plan. New residential communities should employ design and site planning standards which will maximize energy conservation and avoid low density subdivision sprawl, while providing a range of housing types and costs. In addition, such development should employ design concepts which will conserve natural drainage areas and vegetation and foster distinct neighborhood scale communities, each with its own small scale commercial services and public facilities, such as school, park and community center. The community and neighborhood areas should maintain their distinctive identity through land use practices, such as green belts between developments, clustered residential areas, the use of natural landscape features to buffer residential and commercial uses, and road design which will route most traffic away from residential areas. The development of moderate cost rental housing units at appropriate locations is also strongly encouraged.

Subdivisions which employ a cluster design must incorporate public open space of sufficient size and character within the subdivision to accommodate recreational activities. Roads and right-of-ways shall not be considered as public open space in cluster development".

6. Community Scale:

Communities ideally range in size from 4,000 to 10,000 persons or 1,000 to 3,000 housing units at current average household size. Separate communities in the eastern Loudoun area are all tending toward this population range, with a number of distinct neighborhood groupings. This is an appropriate scale of social organization and is encouraged. Support services can be efficiently provided at this level and include volunteer fire/rescue squads, middle schools, community parks and retail shopping. Short automobile trips and pedestrian access for activities is possible.

Figure 3, page 29 shows a generalized breakdown of existing and anticipated development organized according to the neighborhood/community scale concept. The transition zones between planned community areas are occasionally in conflict with this larger pattern. Eventually, zoning should be adjusted to encourage the recognized community pattern. Cautious review of transitional areas to insure adequate physical connections between planned communities in order to permit satisfactory traffic flow and public safety provision is very important. Figure 3 is merely a conceptualization of communities organized to reinforce historical development patterns in a suburban context.

## RESIDENTIAL LAND USE POLICIES

The Eastern Loudoun Area Plan incorporates an approach to residential development management that recognizes both the need for land use harmony and the need to minimize environmental and fiscal disturbances in achieving the goal of a varied, stimulating community.

A. Compatible Land Use Patterns and Buffering:

New housing means new residents, additional automobiles, more children and, therefore, an increasing demand for all community services and facilities. Rapid growth also causes land use impacts beyond those on public services. Reducing land use conflicts is an important objective of this plan. A declining scale of land intensity is suggested by Table 3.

Figure 3

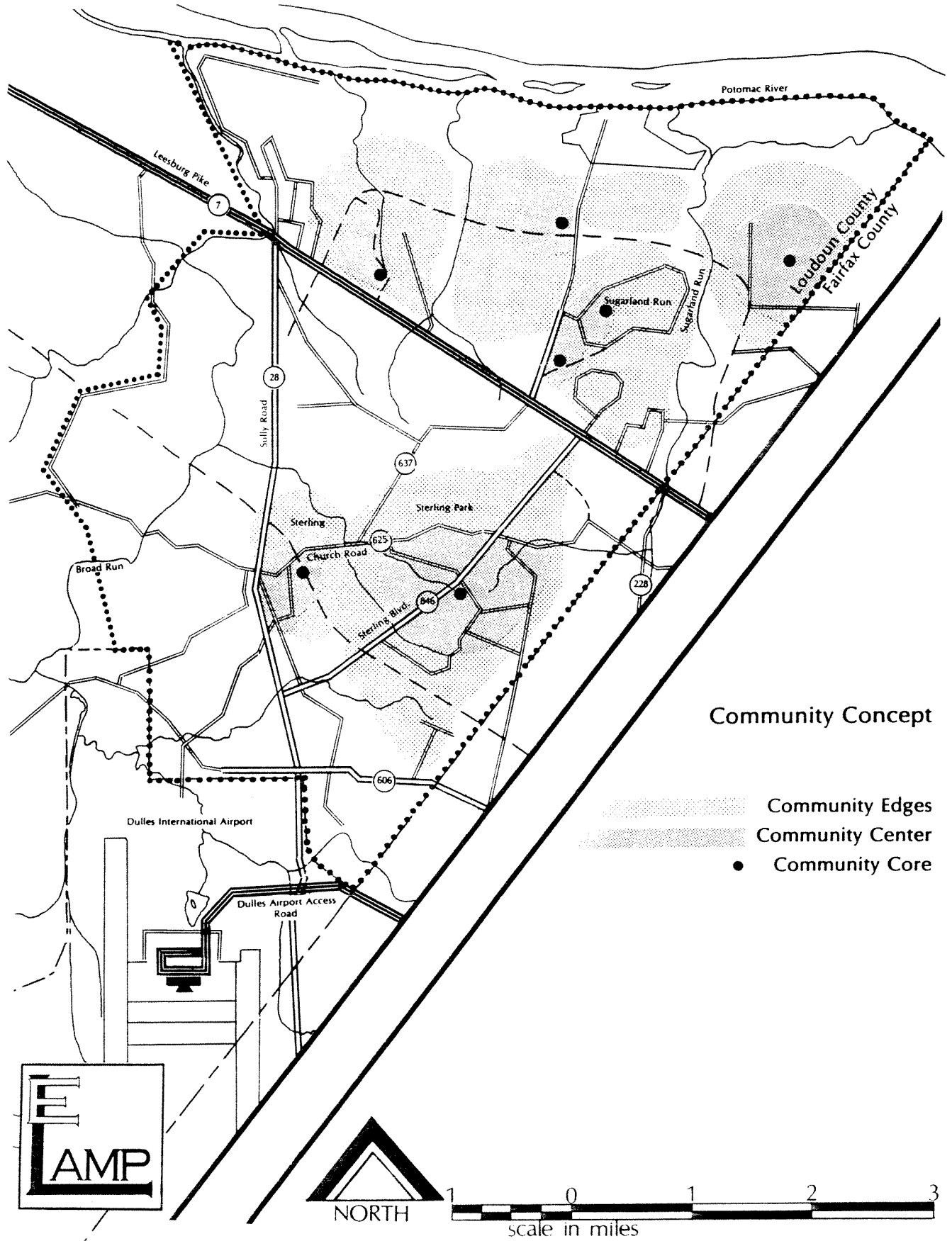


TABLE 3								
COMPATIBLE LAND USES								
	Residential			Commercial	Office	Ware-house	Light Manuf.	Heavy Industry
	Low	Mod.	High					
Residential								
Low	X	X						
Moderate	X	X	X	X	X			
High		X	X	X	X			
Commercial		X	X	X	X	X		
Office		X	X	X	X	X	X	
Warehouse				X	X	X	X	X
Light Manuf.					X	X	X	X
Heavy Industry						X	X	X

Table 3 implies that similar land use intensity levels will be most compatible while extremely intense use is not compatible with residential activity at all. This should not preclude adjustment of the Zoning Ordinance to permit mixed residential/commercial or residential/office uses to occur where appropriate control and design can be obtained. But such development will need additional buffering when adjacent to more traditional residential development. Loudoun County should furthermore seek to buffer all uses of differing intensities. The County will encourage the creation of these buffers and will seek to integrate these with community open space and pedestrian paths where appropriate. (See Figure 4, page 31). The County should also create a new R-3 (residential 1/3 acre lot) zoning district to permit a smoother transition from R-2 to R-4 uses.

B. Clustering:

Loudoun County has long recognized the essential land use disfunction and aesthetic monotony of the traditional suburban subdivision. Through the voluntary cluster provision in the Zoning Ordinance, the County provided the development community with an alternative. Clustering permits a subdivider the option of reducing individual lot size below that required by the Zoning Ordinance with the unused balance of the required lots aggregated in common open space.

Figure 4

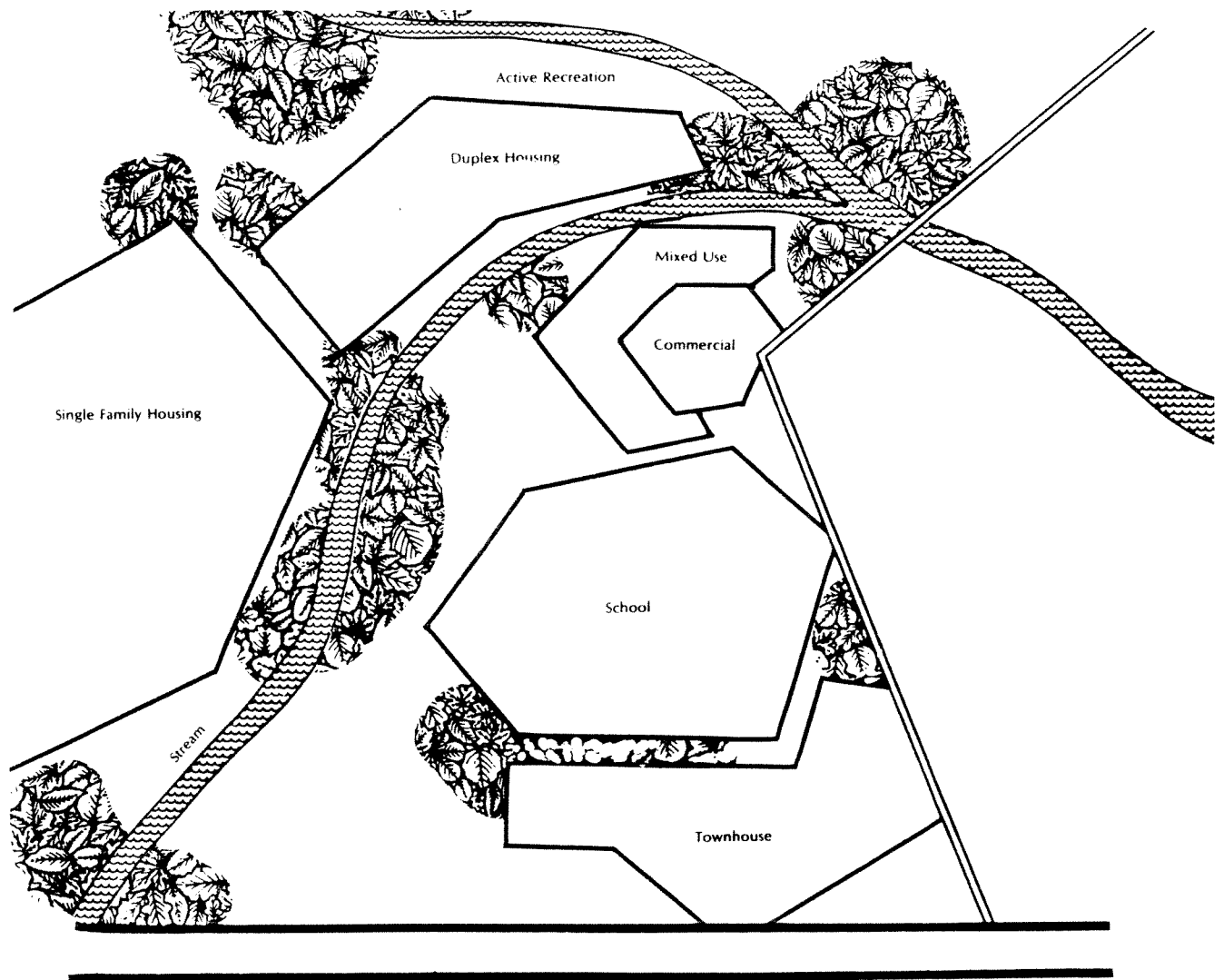


Figure 4

### Cluster Design

Model of Desirable Land Use Pattern: The goal is a full, varied community. Land use harmony is achieved through extensive buffering and land use is determined by energy, environmental, social and economic criteria. Pedestrian movement is possible, and the car is needed for major shopping but not essential for day to day activities. Energy efficiency and environmental criteria are important land use considerations.

In theory, clustering was intended to assist socially and environmentally sound development, reduce unnecessary development costs of roads and utilities and generate open space for community recreation. In practice, clustering has not produced all the intended results. In part this was due to certain other county ordinances which required mandatory road frontage and design standards acceptable to the Virginia Department of Highways and Transportation. In part it was due to development community perceptions that the single-family market was mainly interested in as large an individual lot as possible. In consequence, the cluster provision has been frequently used only as a means to overcome low lot yields caused by difficult environmental conditions such as steep slopes, wet soils and surface water courses. The common open space generated by this negative approach has frequently been difficult to maintain. Often it is inaccessible if not hazardous to traverse and has few possibilities for active community recreation. Homeowners, not surprisingly, have become unwilling to accept responsibility for such unpromising land. This reluctance has been interpreted by developers as lack of interest in open space on the part of buyers. On the other hand, the same homeowners are overutilizing county and private playing fields and have enthusiastically endorsed bonds for additional active recreational areas. The County is convinced that the cluster provision can serve eastern Loudoun better than it has in the past. Loudoun County will accordingly seek to strengthen the cluster provisions with an amendment to the Zoning Ordinance. A cluster provision in the Subdivision Ordinance would seek to accomplish the following:

1. Environmental protection and/or enhancement.
2. Sound road and utility layout.
3. Appropriate site development.
4. Provision of high quality, usable open space.

The Planning Commission would be authorized to recommend approval of a valid cluster design which would permit the developer certain density and utility construction benefits. Should a design fail to gain Commission approval, the applicant will be free to submit an alternate cluster design or one which conforms to the standard zoning regulations of that district.

C. Phasing:

The majority of the recently approved residential developments in eastern Loudoun has involved proffers or conditions which established a phased development schedule. Table 2, page 27 indicates that this time phasing, if followed to the greatest extent, would permit the construction of approximately 1,000 dwelling units per year for at least the next five to six years. This rate of construction, if accomplished, would approximately double the average 500-600 units constructed annually in the past decade, but would prohibit an inordinate construction rate in only a few years such as occurred in 1972-73 when more than 2,000 units were constructed in eastern Loudoun. The importance of phasing is of critical moment since it permits the County to correlate the pace of residential growth with the timely provision of public facilities and services. Loudoun County

will continue to encourage the development community to proffer time phasing which is, moreover, of benefit to private development interests as well.

D. Property Review:

At the time of a rezoning or subdivision application, the County will undertake a social, environmental and fiscal review of the property to ascertain the location, character and extent of land use and/or site development when appropriate. The review will include:

1. Resource Management Plan and Area Plan Conformance:

A review of the property's general location and the conformance of the proposed use with the overall goals and policies of both the Resource Management Plan and the Area Plan.

2. Environmental Review:

The review will focus on environmental consideration of the site: hydrology, floodplains, slopes, soils, etc. to determine the environmental impact of the proposal (See Environmental Plan).

3. Transportation Review

The application will initiate a transportation review to determine transportation impacts, the adequacy of existing facilities, and the costs of attendant improvements (see Transportation Plan).

4. Open Space and Community Design Review:

The provisions of usable, high quality open space, sound buffering, and proposed development layout will form a component of the application's study (see Community Design Plan).

5. Fiscal Impact:

The financial impact of the proposed development on the County's capital and revenue resources will form an important part of the study. Particular attention will focus on the need to invest public funds in capital improvement projects as a result of the proposed development (see Fiscal Plan).

6. Energy Efficiency:

Recent increases in all energy costs have highlighted the need to review all proposals for energy efficiency. The review will focus on such internal factors as site development layout to maximize winter solar gains

and temperate breezes in summer, and such external factors as pedestrian pathways to local schools, shops, and recreational facilities (see Energy Plan).

7. Housing Opportunities:

To encourage the provision of a wide range of housing types within each community and to actively seek the provision of such housing which it deems underprovided.

E. Alternative Development Patterns:

In the consideration of rezoning applications, the County shall also evaluate the specific site for other appropriate development patterns. The applicant would then be free to offer the County such contributions or alternative development patterns which, in the context of the proposal would merit an increase in use intensity. The applicant would, of course, remain free to request the use he deems appropriate for his property, given the existing social, environmental, and fiscal context.

F. Proffers:

The proffer system is an accepted process in Virginia, allowed under provision 15.1-491(a) of the Code of the State of Virginia. Its objective is to provide contributions on a voluntary basis that will satisfy local community needs and avoid duplication of facilities. Under this system the development community offers something to the County in negotiation for higher densities or other waivers of zoning restrictions. It is most commonly used to obtain density credit in residential development through facility site dedication or to assure the County that development will be phased on an incremental basis over time. Trust fund contributions can include direct cash contributions as well as land, site preparation or commitments to phased development over time.

Proffers may include the following among others:

1. Provision of supporting public facilities to alleviate impacts of the proposed development on the community (schools, transportation, libraries, community facilities, etc.)
2. Provision of low and moderate income rental and sale housing which shall be evenly dispersed throughout the entire development.
3. Provision of developed recreational areas or other amenities for common or public ownership.

4. Phasing of development to most nearly coincide with programmed provision of public facilities shown in the current Capital Improvements Program, and to reduce interim adverse social and fiscal impacts on the community.
5. Site design sensitivity and exceptional environmental conservation measures to preserve natural resources associated with the property and reduce development impact on adjacent property.
6. Innovative site and building design to incorporate energy conserving features of particular value to future residents of the development and residents of adjacent properties.
7. Land assembly and/or development plan integration which facilitate achievement of Comprehensive Plan objectives.
8. Preservation and/or restoration of buildings, structures or other features of architectural, historic or environmental significance to the community.
9. Cash contribution to a public trust fund for use by the County in the Capital Improvements Program or other public facility needs.

Loudoun County has accepted proffers from the development community for some years. The process has assisted the County in certain tasks, notably in phasing of development and in the acquisition of public facility sites. The County will continue accepting proffers and will set up procedures to ensure that all parties concerned will have a fair chance to present and evaluate the proffered conditions.

#### IMPLEMENTATION

The following residential land use changes should be seriously considered as each property involved is assessed to determine relationships with adjacent land use and whether the timing of such a change is appropriate and in conformance with the general character of the area. (see Figure 5, page 36)

##### A. Route 28 and 606 Area (Dulles Airport)

The Plan recommends that residential zoning (R-1 and R-2) be phased out of this general area to accommodate the industrial and office land uses projected for the area. The main land use determinants are the noise contours (Post 1995) from Dulles Airport and the probable construction of the DAAR Toll Road (parallel lanes).

1. The existing R-1 located on Routes 28, 775 and 606 (directly north of the airport) is recommended for planned industrial or office use).

Figure 5

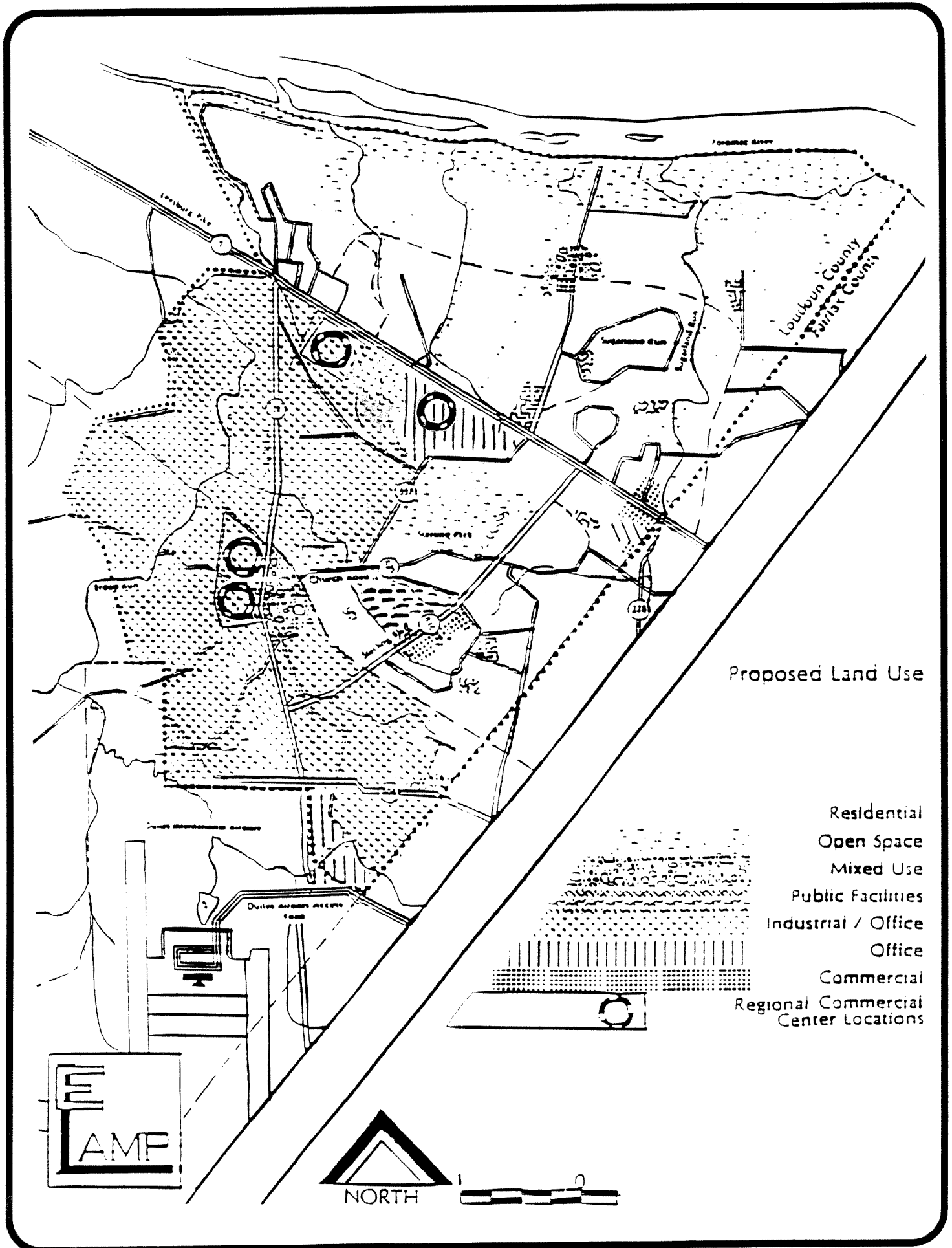
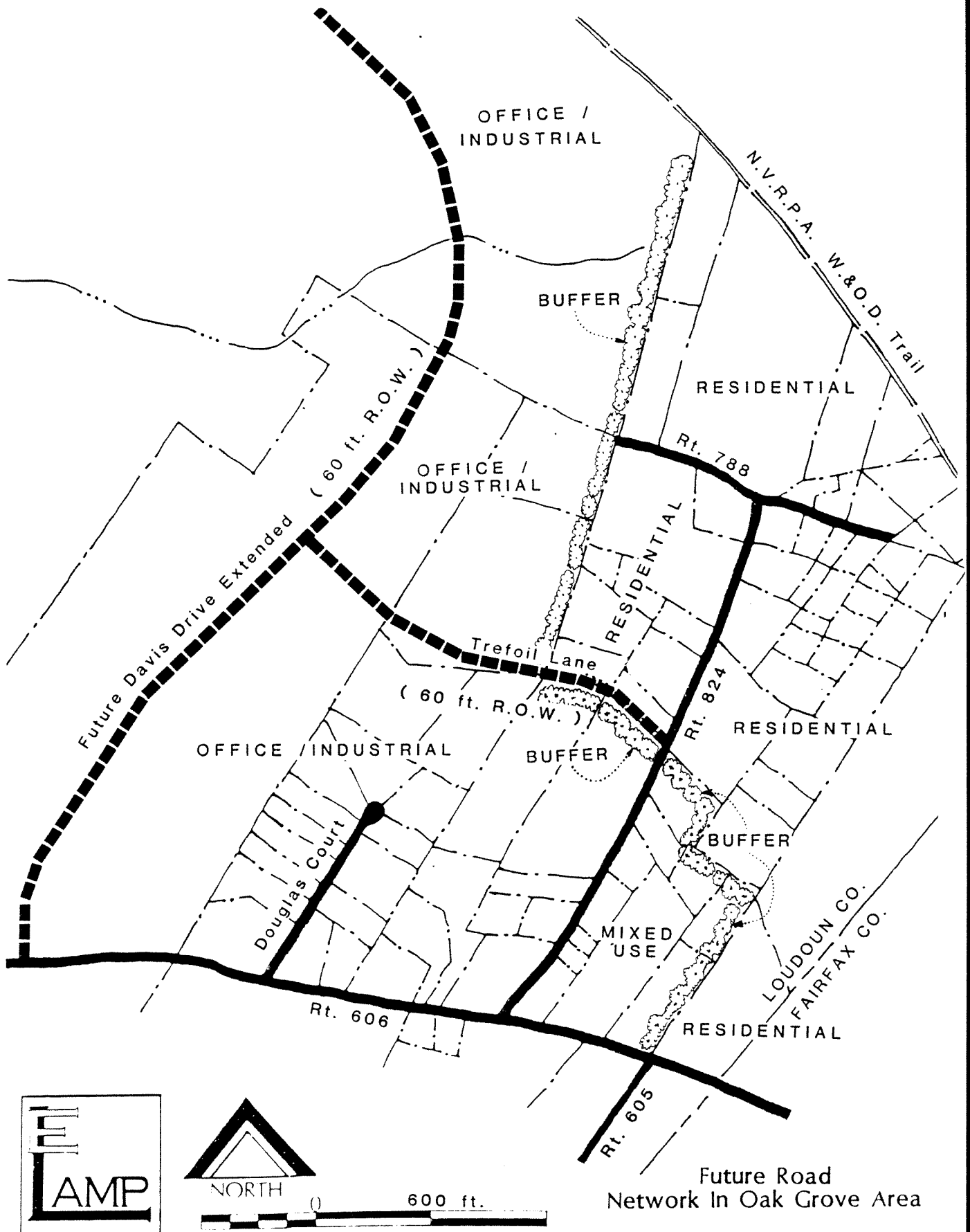


Figure 6



2. The existing R-1 located east of Route 28 and south of Route 606 (Oak Grove) is generally recommended for planned office use. The property abutting the quarry and Route 606 is recommended for planned industrial or office development.
3. Property north of Route 606 adjacent to the Fairfax County line should be developed with offices and limited commercial uses. These commercial uses should be limited to the small parcels located in the immediate vicinity of the county line and Route 606. North of Route 606 and west of Route 824, toward Oak Grove to Trefoil Lane, should be planned industrial or office development. East of Trefoil Lane, toward Oak Grove, should be residential land use with a density commensurate with the surrounding properties, not to exceed three (3) units per acre. Environmental constraints should be considered in the density calculation.
4. The entire border area (approximately 400 feet deep) between the town of Herndon in Fairfax County and Loudoun County should be rezoned and developed in cooperation with Herndon. Logical transition zoning categories should complement adjacent properties in Herndon.

B. Old Sterling and Vicinity

The County's goal for the Old Sterling Area and the vicinity will be to create a balance of residential, commercial, and employment land uses which create a sense of community and strong visual identity for the Old Sterling Area. To achieve this goal the County establishes the following policies:

1. Land Use: The Old Sterling Area will be developed with a variety of land uses which achieve the goal of balanced community. The Plan establishes several distinct land use designations for the area and a Proposed Land Use Plan (see Figures 7 and 8). Ultimate development of the Sterling Area need not be literally consistent with the Proposed Land Use Plan, but should comply with the goals and objectives for the Planning Area.
  - a. Employment land uses - a maximum floor area ratio of 0.40 will be considered for areas designated for employment land use.
  - b. Commercial land uses - a neighborhood-scale shopping center of up to 150,000 square feet could be developed in the vicinity of the W&OD Trail and Route 625.

# OLD STERLING SMALL AREA PLAN

ELAMP  
Spring 1988

The map illustrates the proposed land use plan for the Old Sterling Small Area. It features several transportation routes: Route 28 running diagonally from the top left to the center; Route 625 running horizontally across the middle; Route 636 running vertically on the left; and Route 775 running vertically on the far left. Other roads include Church Rd., Atlantic Blvd., Cablin Branch, Davis Drive, Glenn Drive, and Wood (NVRPA) Trail. The map is divided into various zones, each represented by a specific hatching pattern. A legend on the right side defines these patterns: Keynote Employment (diagonal lines), Flex-Industrial (horizontal lines), Business Park (cross-hatch), Flex Ind./Mixed Use (dense cross-hatch), Mixed Use (vertical lines), and Commercial Neighborhood Center Alternate Sites (a box with the letter 'N'). A north arrow and a scale bar (0 to 1000 feet) are located in the top right corner.

ROUTE 28

ATLANTIC BLVD.

CABLIN BRANCH

RT. 625

CHURCH RD.

RT. 625

RT. 636

RT. 775

65 Ld.

GLENN DRIVE

DAVIS DRIVE

WOOD (NVRPA) TRAIL

PROPOSED  
LAND USE PLAN

KEYNOTE EMPLOYMENT.

FLEX-INDUSTRIAL.

BUSINESS PARK.

FLEX IND./MIXED USE

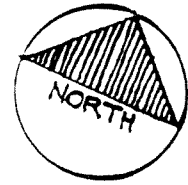
MIXED USE.

N COMMERCIAL  
NEIGHBORHOOD CENTER  
ALTERNATE SITES.

0 500 1000  
FEET

NORTH


ELAMP  
Spring 1988



A horizontal number line with arrows at both ends. It has three major tick marks labeled '0', '500', and '1000' from left to right. Below the line, the word 'FEET' is written in large, bold, capital letters.

RT. 625  
CHURCH RD.

# PROPOSED LAND USE PLAN

- 
- KEYNOTE EMPLOYMENT.
- FLEX-INDUSTRIAL.
- BUSINESS PARK.
- FLEX IND./MIXED USE
- MIXED USE.

**N** COMMERCIAL,  
NEIGHBORHOOD CENTER  
ALTERNATE SITES.

**Figure 8**

**STERLING SMALL AREA PLAN**

PLAN DESIGNATION	DESCRIPTION	POSSIBLE ZONING												
<u>Keynote Employment</u>	High visual quality and high trip generating uses including office parks, research and development parks, and similar uses. Larger scale development (e.g., 40,000 GSF +)	PD-IP, PD-RDP*, PD-OP												
<u>Flex Industrial</u>	Medium scale speculative lease/sale space for a broad range of employment uses including computer hardware/software, biomedical products, electronics. Uses frequently entail vertical integration including R&D, assembly warehousing and sale/distribution. (10,000 - 40,000 GSF)	PD-IP												
<u>Business Park</u>	Relatively small scale business and employment uses which could include home service and business service establishments such as print shops, auto repair, etc. provide locational opportunity for incubator - small businesses. (5,000 - 20,000 GSF)	PD-IP**												
<u>Mixed Use</u>	<p>Parcels designated for mixed use will be encouraged to develop with a broad range of commercial, employment, and residential land uses. Mixed use projects should reflect a unified and compact architectural and site design which emphasizes pedestrian over automobile circulation. Mixed use projects should meet the following guidelines:</p> <table> <tr> <td></td><td><u>Proportion</u></td><td><u>Maximum Intensity</u></td></tr> <tr> <td>Commercial uses</td><td>5% - 25%</td><td>.25 FAR</td></tr> <tr> <td>Employment uses</td><td>25% - 45%</td><td>.40 FAR***</td></tr> <tr> <td>Residential uses</td><td>50% - 70%</td><td>20 Du./Ac.</td></tr> </table> <p>Mixed use projects should be limited to tracts of 10 acres or more. In cases where mixed designated parcels are less than 10 acres in size, the County may consider modifications to the proportion guidelines for the various uses.</p>		<u>Proportion</u>	<u>Maximum Intensity</u>	Commercial uses	5% - 25%	.25 FAR	Employment uses	25% - 45%	.40 FAR***	Residential uses	50% - 70%	20 Du./Ac.	PD-H**
	<u>Proportion</u>	<u>Maximum Intensity</u>												
Commercial uses	5% - 25%	.25 FAR												
Employment uses	25% - 45%	.40 FAR***												
Residential uses	50% - 70%	20 Du./Ac.												
<u>Commercial</u>	Retail service scaled in relation to the available market support within or directly adjoining the planning area.	PD-SC												
<u>Local Offices</u>	Relatively small scale offices for insurance, medical, and legal businesses.	PD-OP												
<u>Residential</u> Low Density Moderate Density	Single-family detached and townhouses Townhouses and garden apartments	PDH												

\* Maximum F.A.R. subject to detailed land use review.

\*\* Could involve the creation of a new zoning district.

\*\*\* Densities above 4.0 units per acre must contain a significant component of affordable housing.

- c. Residential land uses - a variety of residential uses up to a maximum of 4.0 dwelling units per acre will be permitted to develop in the Old Sterling Area. The County will consider densities of up to 20 dwelling units per acre for mixed use designated areas subject to the following criteria:
  - i. Tracts specifically designated by the Land Use Plan.
  - ii. Tracts or portions of tracts not to exceed 30 acres in size.
  - iii. The overall density of the Eastern Loudoun Planning Area (*excluding designated affordable units*) shall not exceed 4.0 dwelling units per acre.
  - iv. A minimum and maximum percentage of the dwelling units will be designated for moderate income households which meet the affordable housing criteria established by the Board of Supervisors, based upon recommendations from the County's Housing Task Force.
2. Transportation: The County's transportation objective for the Old Sterling Area will be to create a balanced, functional, urban road network. Recommended transportation improvements for the Old Sterling Area are depicted graphically in Figures 9 and 10. The provision of regional road improvements will primarily be the responsibility of adjoining properties which will be served by such improvements. As part of the rezonings, subdivision, and/or site development process, the County will secure commitments from the private sector to improve the regional road network. The transportation plan as depicted is conceptual. The plan is intended to identify the need for facilities the exact locations of which are to be determined through the land development process.
  - a. The County will establish a non-residential proffer guideline which will establish minimum levels of developer assistance for helping the County and VDOT upgrade the regional road network.
  - b. The County will establish minimum acceptable levels of service for regional road links and main intersections.
3. Zoning: The existing zoning classifications within the Old Sterling area could result in a development pattern which would not embody the objectives of the Proposed Land Use Plan. In addition, the proposed business park and flex-industrial employment land use designations suggest the creation of new PD employment zoning districts.

\* Maximum F.A.R. subject to detailed land use review.

\*\* Could involve the creation of a new zoning district.

\*\*\* Densities above 4.0 units per acre must contain a significant component of affordable housing.

# OLD STERLING SMALL AREA PLAN

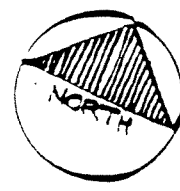
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PROPOSED  
ROAD  
NETWORK

LEGEND:  
△ See Appendix  
\* See Appendix #10

The map displays a network of roads and trails. Key features include:  
- **Major Roads:** ROUTE 28 (top left), ROUTE 625 (middle right), ROUTE 28 (bottom left), and ROUTE 625 (bottom right).  
- **Trails:** ATLANTIC BLVD. TRAIL (top right), C.A.B. LN. (top right), and WOOD (INTRA) TRAIL (bottom right).  
- **Proposed Road Network:** Indicated by thick dashed lines forming a grid-like structure.  
- **Numbered Triangles:** 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 10\*, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.  
- **Scale:** 0 500 1000 FEET.  
- **North Arrow:** Indicated by a circle with 'NORTH' and an arrow pointing up.

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A horizontal scale bar with markings at 0, 500, and 1000 feet. The word "FEET" is written below the bar.

# PROPOSED ROAD NETWORK

LEGEND:



See Appendix

\* See Appendix #10

Figure 10

OLD STERLING SMALL AREA PLAN  
TRANSPORTATION MATRIX

ROADWAY	LOCATION	LANES RIGHT-OF-WAY	DESCRIPTION
1. East Access Rd. Atlantic Blvd.	Steeplechase to Route 625	4 lanes divided 90' row	U4R. Urban Minor Collector. Left and right turn lanes required at all intersections and median breaks. Desirable distance between median breaks 700'. 40 mph design speed.
2. East Access Rd. Davis Drive	Route 625 to Route 634 Extended	4 lanes undivided 70' row (except) 90' row within 225' of major intersections	U4. Urban Minor Collector. 52' Curb face-curb face. Left and right turn lanes required at all major intersections. 40 mph design speed. Controlled access.
3. East Access Road Davis Drive	Route 634 Extended to Sterling Blvd.	4 lanes undivided 70' row (except) 90' row within 225' of major intersections	U4. Urban Minor Collector. 52' curb face-curb face. Left and right turn lanes required at all major intersections. 40 mph design speed.
4. Route 634 Extended	Route 28 Overpass (new) to Davis Drive	4 lanes undivided 70' row (except) 90' row within 225' of major intersections and between Glenn Dr. extended and Davis Drive	U4. Urban Minor Collector. 52' curb face-curb. Left and right turn lanes required at all major intersections. 40 mph design speed. Controlled access.
5. Route 775/Glenn Drive Extended	Route 625 to Sterling Blvd.	4 lanes undivided 70' row (except) 90' row within 225' of major intersections	U4. Urban Minor Collector. 52' curb face-curb face. 40 mph design speed.
6. Route 636 Shaw Road	Route 625 to Sterling Blvd.	4 lanes undivided 70' row (except) 90' row within 225' of major intersections	U4. Urban Minor Collector. 52' curb face-curb face. 40 mph design speed.

ROADWAY	LOCATION	LANES RIGHT-OF-WAY	DESCRIPTION
7. Route 625 Church Road	1,200' West of gore point for Route 28 westside interchange to Route 637	4 lanes divided 120' - 160' row and limited access between Route 28 and Davis Drive. Land required for Route 28 interchange. 110' row between Davis Drive and Route 637	U4R. Controlled access median divided major urban collector. Re-aligned section to become part of Route 28/625 interchange. Left and right turn lanes required at all intersections. 50 mph design speed.
8. Sterling Blvd. Route 846	Route 28 to Davis Drive	6 lanes divided 120' - 160' row plus land required for Route 28 interchange	U6R. Controlled access median divided major urban collector section to be re-aligned north at Route 28 interchange. Left and right turn lanes required at all intersections. 50 mph design speed.
9. Route 28	Fairfax County Line to Route 7	6 lanes divided 200' row, plus land dedication required for interchange ramps at all proposed interchange locations	Freeway. E6R Limited Access. All at-grade access will be terminated when road becomes a freeway. Any short-term temporary access limited to existing intersections and stub roads. 60 mph design speed.
10. "New" East West Connector Road	Route 636 to Davis Drive between Route 625 and Route 634 extended	4 lanes undivided 70' row	U4. Urban Minor Collector, 52' curb face-curb face, 40 mph design speed. This road is intended to be conceptual. The exact location to be determined during land development process.

- a. The County will consider substantive amendments to the provisions of the C-1 (commercial) zoning district which create an incentive for property owners to seek reclassification to appropriate PD zoning districts.
    - i. The County should establish a maximum FAR of between .10 and .20 for the C-1 Districts.
    - ii. The County should reclassify high trip generating uses within the C-1 District as special exception uses.
  - b. The County will establish a new PD Business Park employment district which encourages small-moderate scaled business service and home service establishments.
  - c. Properties which are presently zoned a district classification which is inconsistent with the Proposed Land Use Plan designation will be encouraged to rezone to an appropriate classification. However, the County will permit the development of such properties under their existing zoning.
4. Community Design: The County establishes the following policies in order to reinforce the sense of community and provide cohesive design within the Old Sterling Area.
- a. The County encourages the provision of appropriate setbacks and landscape buffers along the W&OD Trail based on proposed uses. Development adjoining the W&OD Trail should be subject to 1:3 bulk plane which will protect the visual quality of the Trail corridor.
  - b. The County will seek to preserve the existing mature hardwoods which presently line Route 625 (Church Road) between Route 28 and the W&OD Trail. The County encourages the creation of a landscaped boulevard effect along the Route 28 East Service Road and Route 625 which would create a common design element for the area.
5. Public Facilities/Proffer Guideline: The County establishes a new infill development tier for residential projects requesting densities in excess of 4.0 dwelling units per acre and up to a maximum of 20 dwelling units per acre for projects with a significant affordable housing component. Proposed residential densities within the new infill development tier should proffer to assist the County with 35% of the capital facility costs and 50% of the regional road costs associated with such units.

C. Sterling Park Area

The appropriate areas surrounding Sterling Park and within its boundaries should be developed to enhance the sense of community and provide a land use focus.

1. The commercially zoned areas of Sterling Park should retain their commercial and office designations, except that innovative housing proposals with mixed use should be considered on a limited portion of the commercially zoned land, adjacent to the site of the Sterling Park Mall. Transitional land uses and housing proposals that meet the highest standards of design will be considered by the County.
2. The property located south of Route 604, adjacent to the Fairfax County line should be considered for a residential density of up to three units per acre with environmental concerns and the quality and extent of proffers being the determining factors for the higher net density.
3. The property known as the Claude Moore Conservation Education Center and Historic Farm could be rezoned from its present R-1 zoning status to an open space zone or related protective type of zoning which will accommodate future parkland uses. This should be pursued with the present owner.
4. The remaining residential property zoned R-1 located south of the PD-CH district (Bowl America) and north of Route 604 should be multi-family rental development to make a transition into the abutting commercial and office development. Transitional office development may also be considered in this district.

D. North of Route 7 (West of Route 637)

This area will be the main residential development area in the County. It should be designated as the receiving zone for any potential transfer of development rights from other parts of the County.

1. Northern Virginia Community College could be rezoned and given its own zoning category. The primary access point for any future development in this area should be off of route 637 and adjacent properties, not off of Route 7.
2. The existing A-3 zoned property north of Route 7 is anticipated for major residential development with its own community focus and design. The rezoning category should be PDH-12 with no density allowance or transfer for environmentally critical areas or road right-of-ways. A gross density range of one to three units per acre should be considered. Development criteria should include:

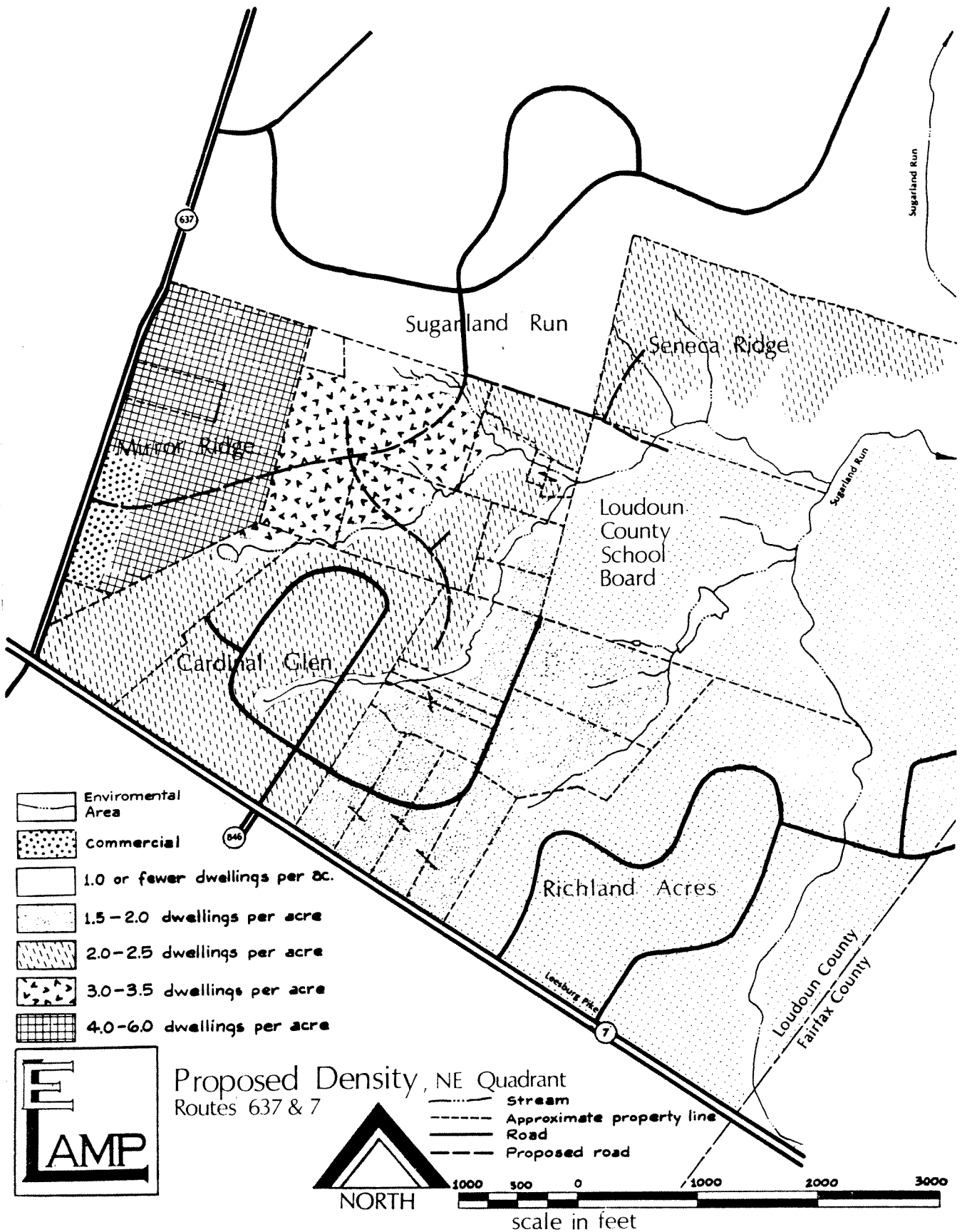
- a. Only one access point should be permitted onto Route 7, to be mutually shared with all adjacent property owners. Signalization is necessary and should be proffered by the developer.
- b. The full four-lane cross section of the Route 28 loop should be dedicated and constructed with appropriate signalization and safety standards employed.
- c. Proffered public facilities and amenities as suggested by the development needs detailed by the Plan, will determine the overall density.
- d. The existing environmental features of the various sites should be preserved and promoted. See Environmental Plan.
- e. This area will require future special study before any rezoning can be undertaken.
- f. Medium density residential densities ranging from 6 to 10 dwelling units per acre are appropriate for development on the two 50 acre parcels located on the north side of the intersection of the Algonkian Parkway with Route 7. Development of these parcels will be contingent upon the Community Design, Infill Development, and Transportation policies contained in the General Plan. The design of the site shall include a 75' dense vegetative buffer to consist of existing trees and shrubs and the planting of additional trees and shrubs; no buildings are to be constructed within 150' of property lines on the east and west borders of the parcels; limited parking will be developed at the perimeter of the sites with most of the parking developed internal to the development; any neighborhood commercial uses constructed should be located adjacent to the road network and oriented towards the Algonkian Parkway.

- 3. Broad Run Farms is zoned R-1 and is recommended for continued one acre development, depending on the availability of sewer facilities.

E. North of Route 7 (East of Route 637 and South of Sugarland) (See Figure 11, page 48)

The undeveloped property in this area is bounded by Richland Acres, Route 7 and Cardinal Glen, Route 637, Mirror Ridge and the planned community of Sugarland Run. It comprises 24 separate parcels on approximately 200 acres and should be developed primarily for residential uses at densities and with housing types both compatible with those of contiguous developments and consistent with the General Plan designation as a residential community. Low rise commercial retail and/or local office uses would be appropriate along Route 7 between Cedar Drive and Lakeland Drive. The specific development details are as follows:

Figure 11



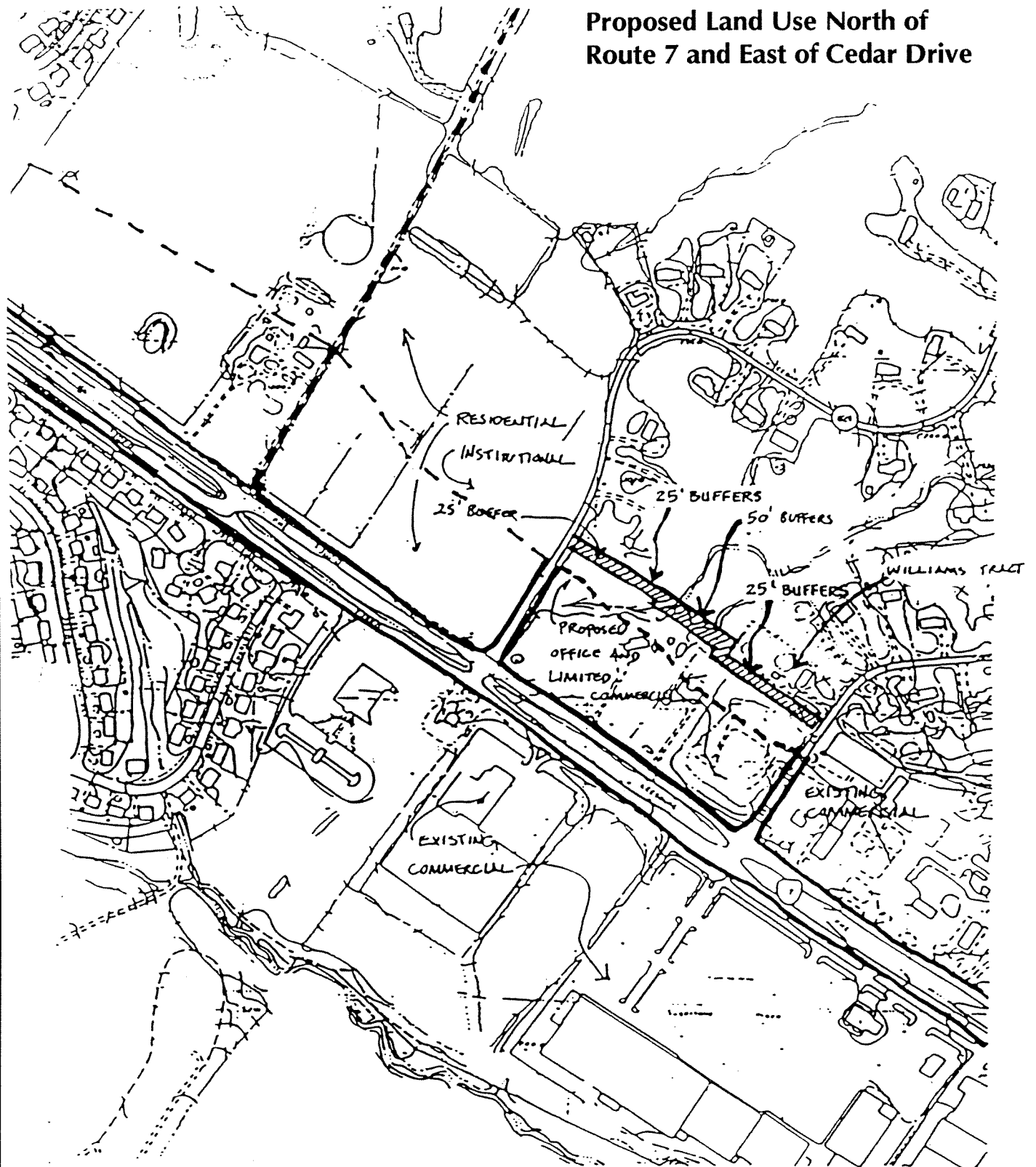
1. The development density gradient should effect a transition from the present 0.9 dwellings per acre of Richland Acres to the east to the 5.5 dwellings per acre of Mirror Ridge to the west, taking into account the 2.5 dwellings per acre of Cardinal Glen and the south Sugarland community.
2. Development plans should include buffers at density transitions whenever possible using natural features such as streams and open space in order to promote harmonious transition from higher to lower densities. Landscaped buffers for visual and acoustical screening should be employed for development where residential and non-residential uses abut.
3. The present R-1 zoning of undeveloped lots in Richland Acres should be continued but low rise commercial retail and/or local office uses are recommended along Route 7 in the area between Cedar Drive and Lakeland Drive. The 10 acre tract along Route 7 between Lakeland and Cedar Drives should be rezoned to non-residential uses only as a unified concept plan. Development Plans for this tract should include careful site design to ensure:
  - Safe and effective vehicle movement from Route 7 into and through the shopping center.
  - Safe and effective pedestrian movement from the north and west into and through the shopping center.
  - The northern portion of the tract facing Richland Acres is free of incompatible non-residential elements such as dumpsters or loading bays.
  - The facades of structures facing Richland Acres be constructed with appropriate finishes and landscaping so as to be a visual and an environmental asset to that residential community.
4. The area should be served by two collector roads: South Cottage Road extended from Sugarland to Route 637 and the extension of Cardinal Glen Circle from Route 7 to the School Board property. The two roads should not connect with each other. These roads should be designed for the area's ultimate development needs.
5. Environmental sensitivity should be employed in the design of each development to respect, preserve and enhance existing streams and drainage ponds such as that of Baskin or of Kaufman/Jenkins. These environmental areas should be designated passive recreation space to be used as walkways to existing and proposed activity centers such as schools, a library and neighborhood shopping center.
6. A continuous access through the tract should be established connecting Lakeland and Cedar Drives. No median breaks on Route 7 should be permitted. Any development proposal for the site should include

transportation solutions which help meet the following objectives and performance guidelines:

- a. No additional median breaks should be allowed on Route 7.
- b. The transportation system should not depend on any new U-turns from left turn lanes to accommodate anticipated traffic movements in lieu of new median breaks and current U-turn/left turns such as those now occurring at Route 7 and Route 228 should be eliminated.
- c. Route 7 should be widened to six lanes in the area, with appropriate contributions to the improvement from new development along the road.
- d. New access to Route 7 at points other than existing intersections should only be considered in cases where:
  - Three full directional lanes of traffic (eastbound or westbound) are proposed in a concept plan by the applicant;
  - Entrances including deceleration and acceleration lanes are in full compliance with VDOT standards;
  - The entrance will not degrade the level of service at proximate intersections
  - Traffic safety problems will not be created; and
  - Unacceptable weave/merge conflicts will not be created on Route 7.
- e. Appropriate stacking distances and lanes will be provided for all left turn movements onto or from Route 7.
- f. To the extent that unacceptable impacts are not created on residential areas, access to office/commercial development north of Route 7 should be by parallel roads/project spine roads. The distance of these roads from Route 7 should be consistent with appropriate stacking distances and lanes for left turns on roads intersecting with Route 7 (see Figure 12).
- g. Roads intersecting with Route 7 should be improved to an appropriate geometric section. The geometric section of the road segment serving office/commercial development shall not be extended in an inappropriate manner to the residential areas to the north. Appropriate tapered transitions should be provided in these cases.
- h. To the extent that unacceptable impacts are not created on residential areas, a continuous parallel road should be provided north of Route 7 (see Figure 12, page 51).

Figure 12

**Proposed Land Use North of  
Route 7 and East of Cedar Drive**



(Option One: Exclude Williams Tract)

———— New Road/Access

- - - - - Widen Existing Road

7. Tax Map 82/Parcel 20 should be developed at a net residential density range of 1.6 to 4.0 dwelling units per acre if the following conditions are met: (a) dedication of 120 foot wide right-of-way for the Route 28 Loop through Parcel 20; (b) construction of two lanes of the ultimate four lane divided section of such road within such right-of-way; (c) the proffer guidelines for determining residential density as established in the Dulles North Area Management Plan (DNAMP) are followed.

F. North of Route 7 (Route 28 Interchange)

This area is scheduled for medium density residential development once the existing landfill operation has exhausted its capacity. The property is zoned R-1 abutting Route 7 and A-3 towards the Potomac River. Future design specifications are:

1. All development should respect the Route 28 Corridor Study for dedication of an interchange and the necessary right-of-way for the roadway. Access should not interfere with the interchange and should be limited in number of access points.
2. Density should be comparable to the neighboring subdivisions of Broad Run Farms and Countryside with the development of medium density residential uses (ranging from 6 to 10 dwelling units per acre) and neighborhood commercial uses to act as a transitional use to the interchange on the two 50 acre parcels located to the north of the interchange (Tax Map 63, Parcels 18, 19, & 19A).
3. Environmental sensitivity should be employed in order that the landfill operation be less visible from adjacent structures.

G. Routes 637 and 7 Intersection

1. Land Use Specifications:

The land area south of Route 7 and abutting Route 637 to the east and west will demand special design considerations. The goal is to preserve the residential character on both highways while allowing low density office uses that will make a transition between the residential and the industrial property to the west. No commercial activity will be allowed. The following land use specifications must be adhered to for any land use proposed in the area:

- a. Sufficient dedication of land area for the proposed grade-separated interchange at Route 637 and 7 (potentially a 700 foot radius from Route 7).
- b. Limited access points on both Route 637 and 7; combined access is encouraged. A highway overlay zoning district will be established.

- c. Conservation of the significant environmental features of the land including the tree cover.
- d. Trail connector from old Sterling to the Potomac River to parallel Route 637 as far as the Northern Virginia Community College with a minimum 25 foot right-of-way.
- e. Preservation of the existing residential uses along Routes 637 and 7.
- f. Land dedication on both Route 7 and Route 637 for eventual widening to eliminate the sight distance problems.
- g. The access points should be limited by the implementation of a highway overlay zone along Route 7.

## 2. Land Use Recommendations:

### Southeast Quadrant of Intersection:

This area should accommodate further institutional uses along Route 7 with proper noise attenuation (i.e., churches, public offices, etc.) plus a residential zoning density similar to the adjacent Sterling Park single-family area. A buffer zone located in the future residential area will be encouraged between the residences and the Claude Moore Park property.

### Southwest Quadrant of Intersection:

This property should be developed with office/light industrial uses to be a transition between the industrial district to the west and the residential area to the east. Access should be limited to one location on Route 637. Low density offices that respect the many environmental features of the land area will be encouraged.

## CONCLUSION

Eastern Loudoun has experienced major growth in the past two decades and trends suggest that this growth will continue in the next decades. The County has adopted a managed growth policy to guide and monitor this development in a manner that is as socially humane, environmentally sound, aesthetically pleasing and financially affordable as possible. The County's goal is to oversee the creation of varied and full communities in eastern Loudoun and ordinances and procedures will be revised as necessary to achieve this.

# APPENDIX I\*

## EASTERN LOUDOUN PLANNING AREAS - HOUSEHOLDS BY TYPE

Planning Area	Type **	Feb. 1979	1979	1980	1981	1982	1983	1984	1985	1990
North of Route 7	SFD	1,322	1,454	1,920	2,495	3,252	3,742	4,123	4,504	5,571
	SFA	719	886	886	973	1,220	1,474	1,554	1,711	2,125
	MF		215	215	215	215	215	349	349	555
SUB TOTAL		2,041	2,555	3,021	3,684	4,687	5,431	6,026	6,564	8,251
South of Route 7	SFD	3,351	3,697	3,910	4,006	4,102	4,282	4,282	4,282	4,282
	SFA	749	893	1037	1211	1385	1385	1385	1385	1385
	MF	126	212	212	212	212	212	212	212	602
SUB TOTAL		4,226	4,802	5,159	5,429	5,699	5,879	5,879	5,879	6,269
Route 28	SFD	144	144	144	192	240	288	336	369	369
SUB TOTAL		144	144	144	192	240	288	336	369	369
TOTAL		6,411	7,501	8,324	9,305	10,626	11,598	12,241	12,812	14,889

\* Figures given are as of December 31 of each year

\*\* SFD - Single-family detached  
SFA - Single-family attached  
MF - Multi-family or Condo

# APPENDIX II\*

## EASTERN LOUDOUN PLANNING AREAS - POPULATION FORECASTS

Planning Area	Feb. 1979	1979	1980	1981	1982	1983	1984	1985	1990
North of Route 7	7,214	8,767	10,458	12,840	16,411	19,041	21,013	22,924	28,506
South of Route 7	15,779	17,825	19,146	20,125	21,104	21,792	21,792	21,792	22,748
28 Corridor	477	477	477	651	825	999	1,173	1,293	1,293
TOTAL	23,470	27,069	30,081	33,616	38,340	41,832	43,978	46,009	52,547

\* Figures given are as of December 31 of each year.

## **ENVIRONMENTAL PLAN**

### **INTRODUCTION**

#### **A. Background:**

The major thrust of the environmental management plan for eastern Loudoun County is the protection of human health, safety and welfare, and the preservation of the resources vital to those ends in the long term. The planning goals of the Resource Management Plan related to natural resources may be echoed for use in this portion of the County:

*"Maintain the high quality of Loudoun County's environment as a unique local and regional resource.*

*Conserve the County's renewable resources at a rate which replaces them at least as quickly as they are consumed and conserve non-renewable resources to the greatest extent possible.*

*Coordinate human activities with the character and limitations of the natural environment so as to limit its disruption".<sup>1</sup>*

Eastern Loudoun is a unique resource for the County and for the metropolitan Washington region. Eastern Loudoun County is now the western edge of the region's urban and suburban development with a more rural way of life than its eastern neighbors. It is an attractive area close to the open countryside on the west and to a large city on the east with less congestion and pollution problems than its eastern neighbors and with taxes that are lower than the close-in suburbs.

The irony in this attractiveness is that it could negate itself as more and more development comes to eastern Loudoun. This portion of the County has felt the metropolitan area growth pressures the most, and as western Fairfax continues to grow, eastern Loudoun will assuredly feel even more pressure. Nonetheless, the toll gates into Leesburg were abandoned decades ago, and their reappearance at the county line would do little to guarantee environmental quality.

Maintaining the quality of the environment and conserving resources in eastern Loudoun means planning for a reasonable amount of growth, guiding that growth into the appropriate areas, managing environmental resources and coping with environmental problems. Coordination of human activities with the natural environment is still possible in the area.

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<sup>1</sup> Loudoun County Resource Management Plan, Department of Planning and Zoning, (adopted May 21, 1979), page 193.

Intrinsic opportunities and environmental constraints may be factored into land use decisions along with traditional concerns of location and economics. The conventional pattern of development that destroys natural processes, creates environmental problems and becomes highly dependent on undeveloped areas for its resources may then begin to change.

The several roles of the Eastern Loudoun Area Plan were recognized in the formulation of this environmental section. The Plan functions as the framework for regulation, and decisions in the Plan affecting an individual's property must be carefully and fairly reasoned and well documented. Restrictive regulation must be linked with valid concerns for the public health and welfare. On the other hand, planning is not necessarily equated with regulation. The Area Plan is not confined to protecting county residents from very grim or dramatic circumstances. It is a reflection of community goals for the future. It announces the concerns of the County related to development and will guide private as well as public investment and decision making. Hopefully, it will provide the framework for a cooperative effort by the county government, county residents and developers to reach agreed upon goals.

B. Environmental Review Process:

Use of maps for analysis is a variation of the overlay design method made famous by landscape architect Ian McHarg.<sup>2 3</sup> In that method, various natural features and values are mapped and then "sandwiched" to give an overall picture of the relative suitability for development. Many plans have used such a method to map conservation and development areas and yet fall short of enhancing environmental quality. The fault, perhaps, lies not with the data or the method but with a lack of follow-through. Therefore, we have tried to keep a strong link with economic and political realities, to consider not only questions of where, but also how development should occur, and to look toward fostering cooperation between planning and development.

Several different types of maps have been used in determining the approach to managing and planning for development and conservation in eastern Loudoun. Floodplain, soils, geology and planimetric maps are among those used in the interpretive analysis. Specific development applications may require further mapping data.

The discussions of different areas which follow a brief inventory of conditions include the rationale for environmental management, a set of policies and the means to implement them. (It is important to note that many recommendations apply to several or even all of the areas identified, but

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<sup>2</sup> Ian L. McHarg, Design With Nature (Garden City, New York: Doubleday/ Natural History Press, 1971)

<sup>3</sup> These maps are on file in the Loudoun County Department of Building and Development.

discussions may appear in only one section simply for the sake of brevity). Recommendations have been made in light of current limitations in administration and enforcement and should be reevaluated and expanded as these resources change. While it will be important to move ahead as quickly as possible with various implementation tools for the Plan, it should be recognized that a steady, but gradual evolution of environmental management may be most effective for Loudoun County.

The establishment of progressively refined environmental goals is, in itself, a major step in the environmental management process. These are important seeds for a variety of programs and will function as "notices of intent" while other planning tools are set in place.

C. Sources:

Information on natural features as well as other special environmental considerations was used in the Plan. The primary mapped information sources include:

U.S. Geological Survey topographic maps

Loudoun County Soil Survey, issued September 1960

Federal Aviation Administration Noise Exposure Forecasts for Dulles Airport (Post 1995)

From these sources, several types and levels of interpretative maps (listed below) are under development for use in the Plan and for future reference. The mapped information and committee discussions, as well as written material provided the picture of eastern Loudoun on which the Plan is based. These maps are not all shown in the Plan.

General Development Potential  
Drainfield Potential  
Agricultural Potential  
Hydrology  
Vegetation  
Slopes  
Erodability Hazards  
Soil Infiltration Ratings  
Noise Zones  
Waste Disposal Sites  
Landforms

It is important to stress that the maps in this Plan are interpretive and generalized and should not be considered sufficient for review of site plans. Information on these sorts of maps is admittedly simplified, but useful for

community-scale planning and as a tool for decision making. The maps referenced and presented here represent the best and most easily usable information available at this time.

This is not to suggest that the environmental plan rests on unreliable data, but only to recognize the limitations of the data and assure that it is not misrepresented or misused. Some specific points or assumptions may be subject to debate ad infinitum by various specialists, but the body of information collected is a sound basis for environmental planning decisions.

## EXISTING CONDITIONS

### A. Regional Context:

All of the nearly 20 square miles of the eastern Loudoun area lie within the Piedmont physiographic province and, like the rest of the County, entirely within the Potomac River Basin (see Figures 1 and 2, pages 59 and 60). The Piedmont Plateau, situated between the coastal plain to the east and the Blue Ridge Mountains to the west, is a province of rolling hills stretching for a thousand miles from southern New York to Alabama. The plateau slopes eastward to meet the relatively flat coastal plain and becomes more rugged toward the southern end. The familiar edge of the two provinces in this area is at Great Falls.

### B. Geology:

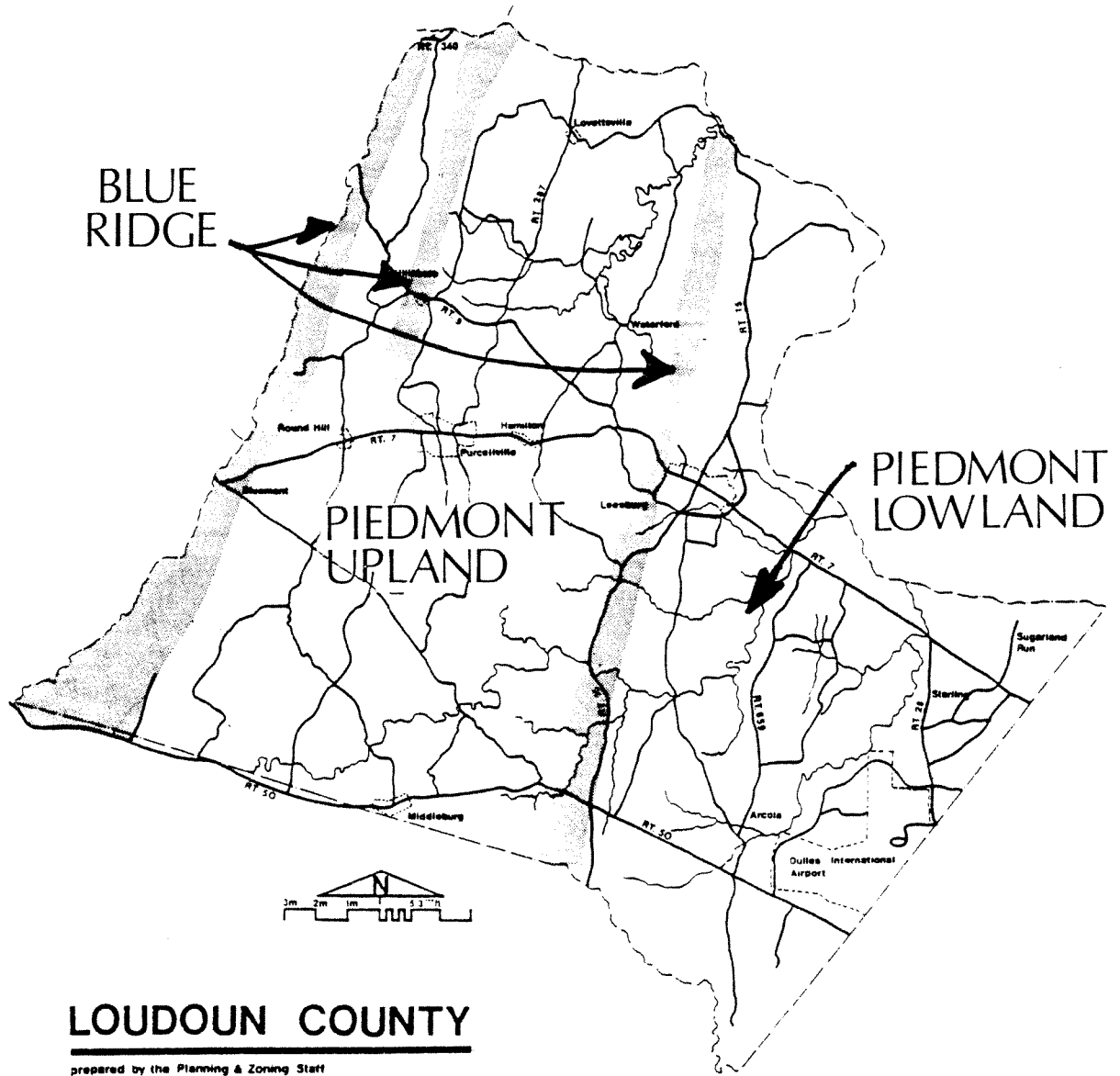
For planning purposes, geological formations are important to consider in determining foundation stability for roads and buildings, suitability for well and septic systems and the potential of a particular formation for mining or quarrying. In addition, the resistance of the different geological formations to weathering has produced the present landscapes, surficial deposits and soil types.

The geology of the eastern Loudoun area is explained in detail in a technical report titled: "Geology of the Eastern Area Plan: Loudoun County, Virginia", (Richard Weber, 1980), which is on file at the Loudoun County Planning Department and in the office of the Loudoun County Soil Scientist and is included by reference as a part of this Plan.

### C. Topography:

As mentioned before, eastern Loudoun is an area of gently rolling hills, with low ridges. The elevations range from about 190 to 440 feet, with the lowest points closest to the Potomac River and the average elevations increasing with distance from the river. The highest point is at Mount Sterling, a hilltop rising above the surrounding landscape south of Route 7; Church Road

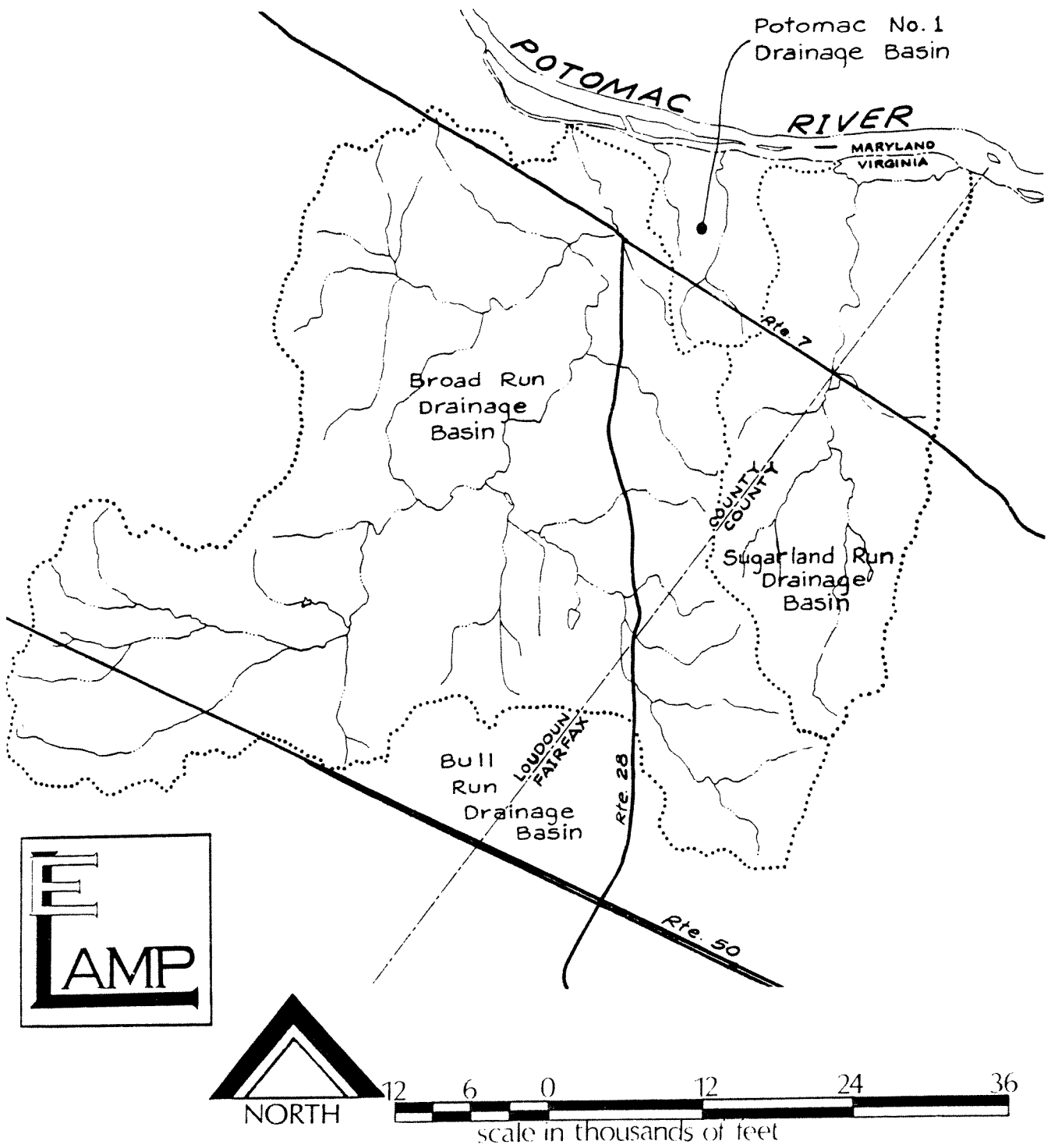
Figure 1



## Physiographic Provinces

Figure 2

## Drainage Basins



or Route 625, follows this ridgeline and offers something of a panoramic view in non-forested spots. Another relatively high elevation is a north-south ridge near Oak Grove.

The steep slope areas (15 percent inclinations and greater) evident from the USGS topographic maps are primarily associated with the streams of the area. Severe slopes are found along Broad run and also the tributaries to the Potomac in the northeast corner of the eastern area. The exceptions to this correspondence of steep slopes and streams are some of the alluvial terrace slopes along the Potomac (important because of the potential for instability), the Mount Sterling slopes and, of course, the quarry operations near the airport. Unlike the landscape in other areas of the County, these eastern steep slopes do not take up large blocks of land, but are found scattered throughout the area.

D. Vegetation:

Like the rest of the County, this area was at one time heavily wooded but was cleared substantially for early farms and settlements. The area still has large amounts of vegetation, some of which is poor quality -- mostly cedars -- growing on abandoned crop or pasture land. Hardwoods and mixed hardwood and pine stands are more prevalent south of Route 7 than to the north, where there are large stretches of pine running across the area. To the north of Route 7 an area of note is the Broad Run Farms subdivision which, up to this point, has maintained a wooded character despite development.

An overlay of slope and vegetation maps reveals a number of steep slope areas unprotected by vegetation, but some important stretches of trees along water courses, including Broad Run and Sugarland Run, are still standing. When future approved and proposed developments are considered, there still remains ample room to plan for woodland and tree protection to maintain streams and soils, accommodate wildlife and provide aesthetic and recreational amenities.

E. Hydrology/Water Quality:

The dominance of the Potomac River in shaping this areas's natural features is still evident. A study of landforms shows the alluvial terraces which were created by the river in its changing stages throughout the years, and there are large areas of floodplains and wet lowlands. Within the area, there are three major watersheds: Sugarland Run, Broad Run and Potomac Basin Number One. Some of the streams that feed Sugarland Run and Broad Run originate in Fairfax County, while all five square miles of Potomac Basin Number One lie entirely within the eastern Loudoun area. There are only a few named tributaries in the area; Cabin Branch which is a tributary to Broad Run crosses Route 28 and south of there Indian Creek enters Horsepen Run, another Broad Run tributary.

Under Section 305b of the Federal Water Pollution Control Act, the State is required to report periodically on the water quality of its streams. The most recent 305b report released by the State<sup>4</sup> does not include any specific data on the streams in eastern Loudoun, but notes that the stream quality of this area is generally good. However, the study does show that except for instances of industrial pollution in rural areas, stream quality generally diminishes with proximity to urbanized areas. There is no reason to expect that without water quality planning. Loudoun County's streams would be the exception to the trend.

Maintenance of water quality, a valid goal of itself, is of heightened importance in part of eastern Loudoun because of the intake point for Fairfax County's water supply where Old Sugarland Run enters the Potomac. Stream quality standards, mandated by Federal law and dependent upon stream use, are set at a higher level in the northern section of the eastern Loudoun area to reflect this use. These standards apply to ambient or overall stream quality and are indirectly related to the characteristics of effluent or specific point-source discharges.

Concern with the growing metropolitan region's water resources prompted the State Water Control Board to adopt the Dulles Area Watershed Policy in 1975. That policy, which is still in effect and applies to much of the eastern area, is a wastewater management policy "which includes stringent effluent standards and is intended to protect water quality in the watershed and downstream water supplies."<sup>5</sup> The Dulles Watershed Policy focuses on maintaining ambient quality by controlling point discharges and, at this time, prohibits any new discharge points in the watershed. The only existing direct discharges into streams in eastern Loudoun are found along Sugarland Run, where three sand filter waste systems were installed prior to more stringent regulation. Although these limited discharges are not monitored, the Watershed Policy gives the area an overall high level of protection from waste discharges, and that protection goes hand in hand with a dependence on Blue Plains treatment capacity. (See section on Water and Sewer in Public Facilities Plan). Direct discharges of wastes into the area's streams, then, do not pose immediate threats to water quality, and a more pressing concern appears to be non-point pollution from the increasing quantity and decreasing quality of stormwater runoff.

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<sup>4</sup> Virginia State Water Control Board, Water Quality Inventory (305(b) Report): 1976 Report to EPA Administrator and Congress (Richmond: State Water Control Board, 1976).

<sup>5</sup> Thomas M. Schwarberg, Regional Director, Northern Regional Office, State Water Control Board, Memorandum, June 15, 1978.

F. Air Quality:

Like water quality, air quality may be viewed to some extent as a matter of relative standing, and from that perspective, eastern Loudoun stands above Fairfax County and other more developed neighbors, but behind areas to the west. Again, although local air pollution is not now troublesome, increasing development and loss of vegetation have historically been associated with higher levels of many pollutants. This region has not reached compliance with national air quality standards established by the Federal Clean Air Act, and a cooperative approach toward resolving this situation is required. The greatest challenge in this effort is not from point-source emissions, which are covered by regulations administered by the State Air Pollution Control Board, but from the more diffuse or non-point sources, namely the automobile traffic. These emissions can be decreased by the elimination of stop lights, congestion and traffic back-ups and by reduction in traffic volumes. Since Loudoun County will not be asked to participate in the State Air Pollution Control Board Vehicle Inspection and Maintenance Program, it will be more important to insure that adequate planning be used to eliminate congestion areas.

ENVIRONMENTAL AREAS AND POLICIES

A. Environmentally Critical Areas:

1. Examples:

- a. 100 year floodplain
- b. 25% and greater slope
- c. 15% to 25% slope adjacent to watercourses

2. Management Policy:

Substantial restriction of development.

3. Sources used to determine location of critical areas:

- a. HUD Flood Hazard maps
- b. USGS Topographic maps, 1" = 2000'

B. Environmentally Sensitive Areas:

1. Examples:

- a. Areas of high erosion potential
- b. Stream buffers

2. Management Policy:

Subject to development restrictions and performance regulations.

3. Sources used to determine location of sensitive areas:

- a. Hydrology maps
- b. USGS Topographic maps, 1" = 2000'
- c. Soils maps
- d. Vegetation maps

C. Soils Assessment Zones:

1. Examples:

Soils with very poor development potential due to:

- a. Wetness
- b. Plasticity
- c. Rock

2. Management Policy:

Engineering studies prior to development plans.

3. Sources used to determine location of soils assessment areas:

- a. Soil maps
- b. "Interpretive Guide to Soils for Planning in Loudoun County, Virginia" (Richard Weber, 1979)

D. Noise Zones:

1. Examples:

- a. NEF<sup>6</sup> 40
- b. NEF 30

2. Management Policy:

Regulation of type of development and limitations on residential development.

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<sup>6</sup> Noise Exposure Forecast

3. Source used to determine location of noise zones:

F.A.A. Noise Exposure Forecast maps

CRITICAL AREAS

The Resource Management Plan discussed certain critical areas whose protection is vital to the health and welfare of existing and future communities of Loudoun County. The "*continuation in their natural state*" is necessary for:

*"the long term integrity of terrestrial and aquatic systems: and the protection of the general health, safety and welfare of Loudoun County's residents."*<sup>7</sup>

In other words, the "highest and best use", generally thought of in terms of economic return, has actually been dictated by natural processes, and for critical areas, that optimal use is found in the contribution to an environmental quality balance. While there are numerous areas critical to environmental quality which were discussed in the Resource Management Plan at some length, the designation of critical areas has been done as selectively and as narrowly as possible to assure that this planning tool functions to protect environmental quality rather than prohibit development per se. For this and other area plans, critical areas will be defined as the land and resources which are so highly vulnerable to development or whose development presents such a threat to public welfare that intensive uses must be severely restricted. In general terms, these areas are not to be used for residential, commercial or industrial purposes but should be restricted to recreational or agricultural uses; specific uses should, of course, be clearly delineated in zoning and subdivision ordinances.

In light of the use implications, an additional and important factor in these designations was fairness to landowners. Hence, a consideration of "fair warning" was also made, and the severity of problems as well as the extent to which there has been relatively widespread and long-standing knowledge of these types of problems both weighed in the final determination of critical versus sensitive areas. For eastern Loudoun, the critical area designation is reserved for two types of land, floodplains and steep slopes. Because these lines have been so selectively drawn and because preservation of critical areas is necessary to prevent public harm and not merely to secure public amenities, density transfers will not be applied. While this "undevelopable" land does not of itself merit density credit, the County should condone and encourage any efforts by developers to protect these resources and implement the goals of the Plan. Thus, density bonuses would be appropriate for proposals in accord with all of these goals that specially enhance these resources and their utility to the community.

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<sup>7</sup> Loudoun County Resource Management Plan, Department of Planning and Zoning, (adopted May 21, 1979), page 12.

## Floodplains

The need to keep development out of floodplains is not only a matter of long-term cumulative damages to a crucial ecosystem, but also immediate threats to health and safety. According to a recent study supported by the National Science Foundation, riverine flood is this country's most devastating natural hazard, and Virginia is among 35 states that suffer more than \$20 million in building losses due to flooding in an average year.<sup>8</sup> In 1969, the toll from Hurricane Camille in Virginia alone was 114 lives and \$113 million in property damage. In 1972, Hurricane Agnes took 22 lives and inflicted \$330 million in damage.<sup>9</sup>

In eastern Loudoun, the largest recorded floods prior to Hurricane Agnes occurred in 1943 and 1937, when the floodplains of Broad Run and Sugarland Run were devoted primarily to agricultural uses. Agnes, however, was a dramatic reminder to the rapidly suburbanizing area that unwise development of floodplains can result in unpredictable losses. During that hurricane, 11.9 inches of rainfall were recorded at Dulles Airport in a 24 hour period and several residences along lower Broad Run were severely damaged.<sup>10</sup>

The magnitude of flooding problems has been recognized at the national level with the Flood Control Act and the National Flood Insurance Program, and the approach to flood protection has changed considerably over the years. As it became apparent that losses due to flooding were climbing along with flood-abatement expenditures,<sup>11</sup> the policy emphasis moved from keeping floodwaters away from people to one of keeping settlements away from flood-prone areas. A now widely accepted view of floodplains is summarized in Water in Environmental Planning: "It is human encroachment on the floodplains of rivers that accounts for the majority of flood damage. Because it is a natural attribute of rivers to produce flows that cannot be contained within the channel, the floodplain is indeed a part of the river during such events".<sup>12</sup>

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<sup>8</sup> J.H. Wiggins Company for the National Science Foundation, Building Losses from Natural Hazards: Yesterday, Today, and Tomorrow, Grant No. ENV-77-08435, p. 13.

<sup>9</sup> Glenn R. Wall, "Two Decades of Floodplain Management: The TVA Regional Experience" in Land Use Issues: Proceedings of a Conference, J. Paxton Marshal and Peter M. Ashton, eds. (Blacksburg, Virginia: Extension Division, Virginia Polytechnic Institute and State University, #269, 1974), p. 91.

<sup>10</sup> U.S. Department of Agriculture, Soil Conservation Service, Flood Hazard Analyses: Broad Run - Sugarland Run (Richmond: October 1974), p. 3

<sup>11</sup> Glenn R. Wall, p. 92

<sup>12</sup> Thomas Dunne and Lunda B. Leopold, Water in Environmental Planning (San Francisco: W.H. Freeman and Company, 1978).

Guiding development to areas outside of floodplains is also important to maintenance of a stream's ecological equilibrium, since the destruction of natural flushing or overspill areas can have damaging effects. Development in these areas may change stream geometry and flows, lower water quality, seriously impair a stream's natural cleansing process, destroy stream life and interfere with groundwater recharge. The valuable role of the floodplains as well as the safety threat dictates their designation as critical, undevelopable areas.

#### Policies:

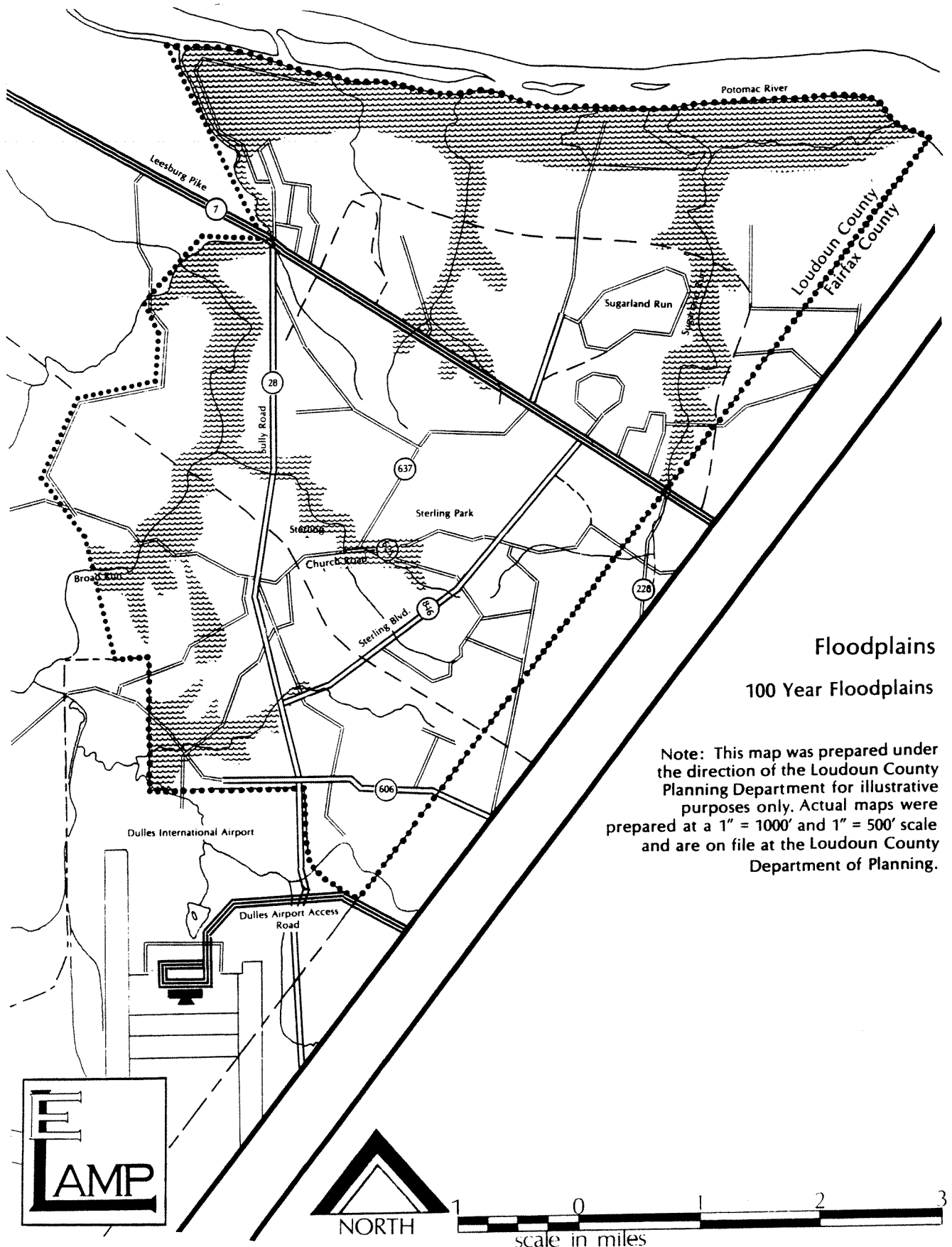
1. To protect county residents from the dangers of flooding and to protect public and private property from flood damages.
2. To guard the ecological role of the floodplains in maintaining stream flows, aquatic life and water quality.
3. To minimize the dangers and costs of uncertainty in regard to flooding that are worsened by numerous incremental changes to flood levels.

#### Implementation:

1. These critical areas should include all land in the 100 year floodplain, as shown by the most reliable information available - HUD insurance maps, flood hazard analyses or special studies. While many people are familiar with the term 100 year floodplain, it may be important to note that this is not an area that would be expected to be inundated only once every century. The year designation of a floodplain is an indication of the probability of inundation based on statistical analysis of stream flow records, and the 100 year flood is one which has a one percent probability of occurring in any given year. It could, in fact, occur several times in one year and one occurrence does not lessen the probability of its recurring the next year.
2. Because it is necessary to rely on this system of statistical measurement rather than some physically recognizable boundary, floodplain mapping efforts should receive continued support from the County, and mapping should be converted to an easily understandable and usable format for public information and easy administration of floodplain regulations. (Figure 3, page 68 is for illustration purposes only.)

The Floodplain Ordinance should be reviewed and amended to assure that it is consistent with the policies of this plan and reflects both the goals of flood protection and resource preservation.

Figure 3



3. Because there has been some encroachment into floodplains of eastern Loudoun, most notably industrial uses near Dulles Airport, a policy for those non-conforming uses should be set. Such a policy should recognize the investments already made and expectations for expansion without compromising the goals and objectives related to floodplains. Other jurisdictions, particularly those which have felt substantial pressures to develop their floodplains, should be consulted.
4. As a crucial counterpart to the Floodplain Ordinance, a comprehensive Stormwater Management Policy and supporting ordinance must be developed. The main thrust of such a policy should be to maintain the natural water flow levels, velocity and timing. (See Figures 4 and 5, pages 70 and 71 for illustration of urbanization effects). Water quality impacts should also be addressed to the greatest extent possible.
5. Efforts should be made to assure that there is widespread citizen education about flood hazards and county policy on floodplains. This should include an investigation into the possible use of disclosure laws on land sales that require notice of floodplain information on individual tracts.

### Steep Slopes

"Landscape is an assemblage of slopes,"<sup>13</sup> which are of great concern in land use planning from the standpoint of initial costs of development, costs of providing public services, integrity of the visual environment, stormwater management, erosion and sedimentation and slope failure hazards. Slopes play an important role in the hydrologic cycle by guiding the flow of surface water and forming drainage systems, and, as discussed in the Resource Management Plan, hillsides are natural features in which "slope and soils are in balance with vegetation, underlying geology and the amount of precipitation."<sup>14</sup> This natural equilibrium is often very delicate, and human interference, in terms of changing slope inclination, adding pavement and speeding up water flows or simply removing vegetation, may have calamitous effects. One text on environmental analysis points out that it is not unusual to find artificial slopes with "changed inclination, drainage, and vegetation"<sup>15</sup> that erode and fail in spite of stabilization efforts, and experiences in Loudoun County would bear that out.

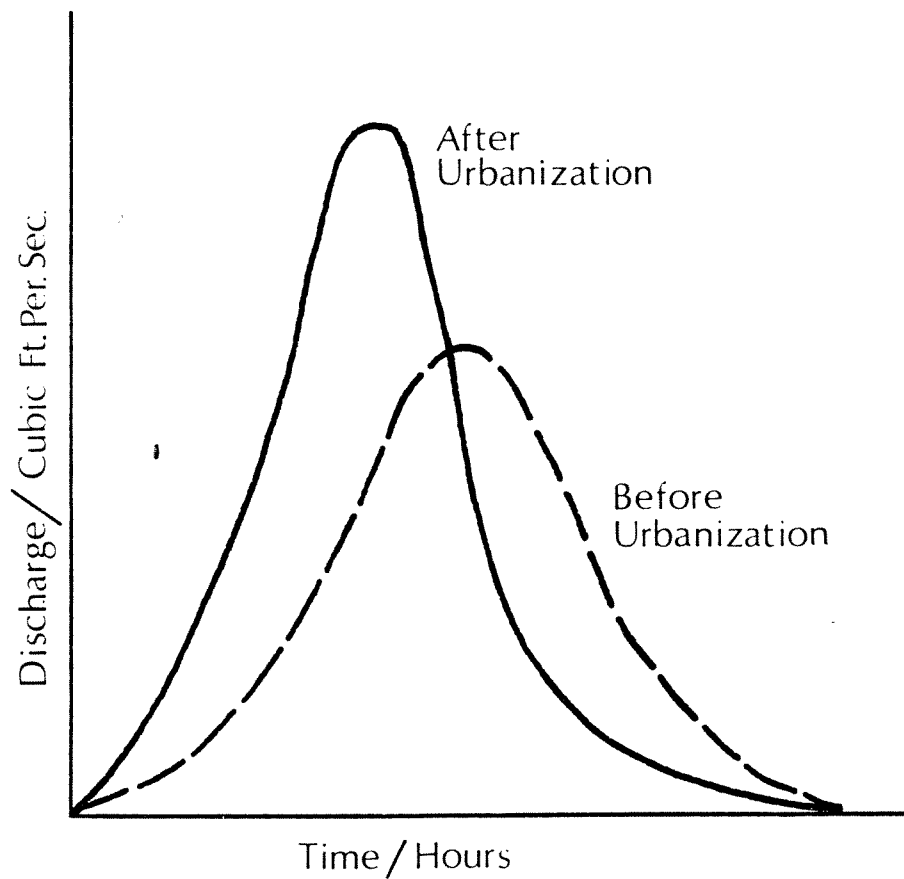
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<sup>13</sup> William M. Marsh, Environmental Analysis for Land Use and Site Planning (New York: McGraw Hill Book Company, 1978), p. 50

<sup>14</sup> Loudoun County Resource Management Plan, (Adopted May 21, 1979), p. 12

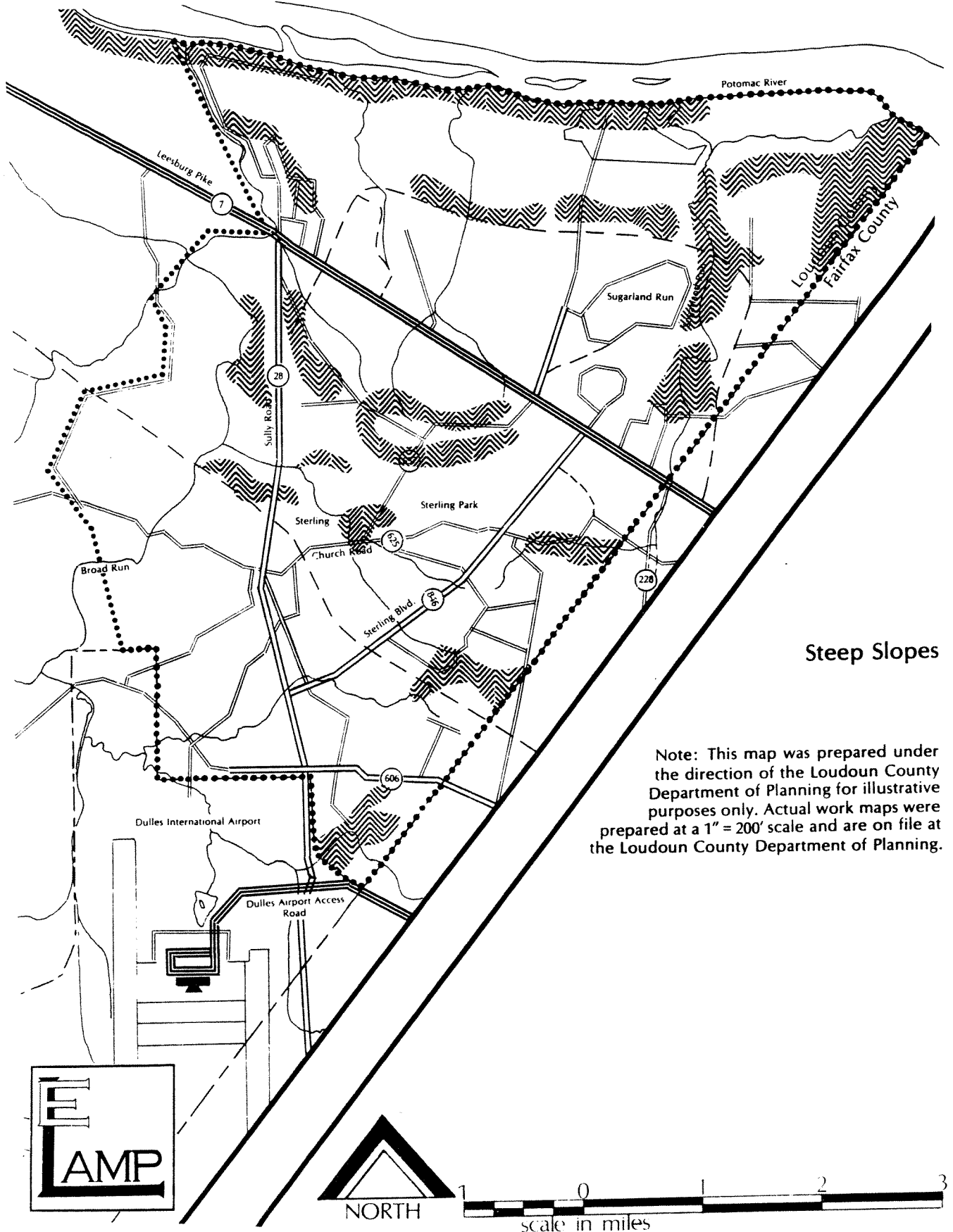
<sup>15</sup> William M. Marsh, p. 51

Figure 4



**Stream Hydrograph** depicting  
rise and fall of flow in response to same amount  
of rainfall.

Figure 5



Perhaps because of the sometimes dramatic consequences of development on steep or unstable slopes, there has been a relatively lengthy history of hillside regulation. Slope-density scales and designation of steep slopes as critical or conservation areas are both quite common. These are somewhat simplified approaches to maintaining a complex natural equilibrium, but are nonetheless useful tools for reasoned land use planning, because slope inclination stands out as a major element affecting this natural balance. "Other factors being equal, as slope increases so does the potential for environmental degradation, including slope failure, increased erosion, sedimentation and runoff. In lowering densities as a function of slope, the potential for environmental degradation is decreased."<sup>16</sup>

The Eastern Loudoun Area Plan proposes a dual approach to hillside development, with a designation of severe slopes as critical areas and a move toward controlling the intensity of development and how development takes place on the intermediate or less severe slopes (to be discussed further in the section on Sensitive Areas).

#### Policies:

1. To recognize and respect the natural equilibrium that balances soil loss with soil formation and which plays an integral role in the hydrologic cycle.
2. To protect the public from the hazards of slope failure.
3. To limit the degradation of water quality brought about by erosion and sedimentation from disturbed slopes.
4. To assure that unwise development of slopes does not add to the difficulties of stormwater management or excessive public facilities costs in developing watersheds.

#### Implementation:

1. Severe slopes should be defined as any slopes with an inclination of 25% or greater regardless of location and any slope from 15% to 25% adjacent to a watercourse. These delineations follow from the goals which stress water quality as well as other concerns. Again, they are intended for incorporation into comprehensive hillside regulations.
2. For the Area Plan, slopes have been mapped at the 1" = 1000' scale, and this illustrates most areas of concern. However, slope must be

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<sup>16</sup> Charles Thurow, William Toner and Duncan Erley, Performance Controls for Sensitive Lands: A Practical Guide for Local Administrations, (Chicago: American Society of Planning Officials, Planning Advisory Service, No. 307, 308, 1975), p. 73

indicated on individual development plans submitted for review. The area falling into the severe slope category should be subtracted from the total area for density calculations. (See Figure 6, page 74).

3. Since vegetation is a crucial slope stabilizing factor, retention of vegetation on critical slopes is necessary. Removal of significant amounts of vegetation on critical slopes should be prohibited first through the Subdivision and Erosion Control Ordinances and eventually through woodland protection and hillside regulations that address a variety of slope conditions.
4. Artificial drainage channels cannot be constructed which would significantly change either the amount or velocity of water flowing over such slopes, and development adjacent to severe slopes should not produce additional stormwater runoff, channeled or otherwise, which could create stabilization or erosion problems. The Subdivision Ordinance should be reviewed and revised as necessary to include guidelines in this area and sufficient flexibility for developers to respond to this concern.
5. Likewise, artificial slopes which are excessive or inherently unstable cannot be created on development projects. The Subdivision Ordinance should be expanded to address these concerns.

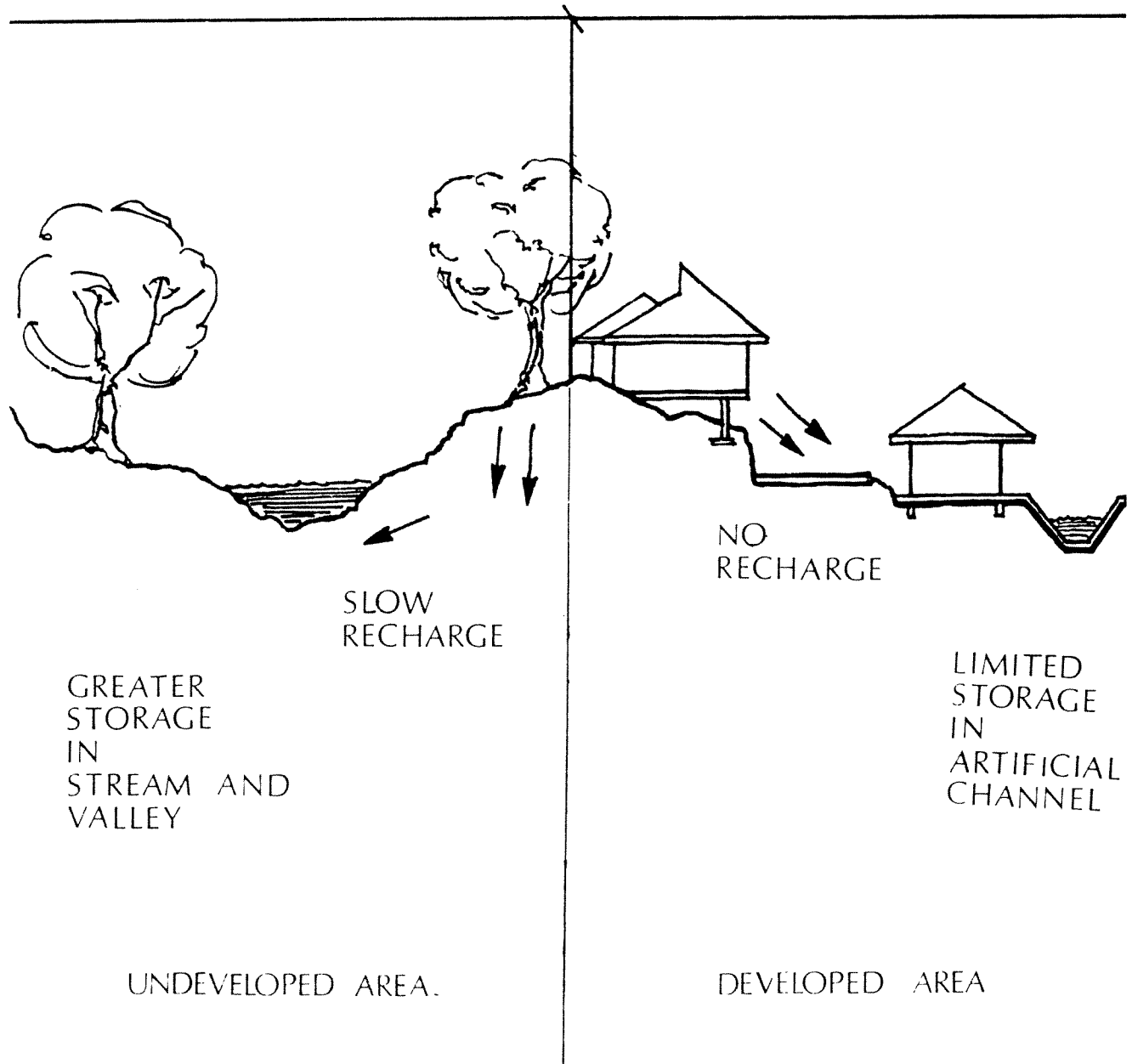
### SENSITIVE AREAS

The Resource Management Plan has set forth a general goal of maintaining a high level of environmental quality, and in keeping with that goal this area plan emphasizes that there is a continuum, not an on/off point for a healthy environment. The Area Planning Committee discussion pointed to the need to recognize that continuum and to strive for keeping the environmental quality of eastern Loudoun at the high end of this spectrum for the long-term. This approach is in contrast to one which protects a few resources and otherwise permits or even fosters environmental degradation which is incremental but nonetheless irreversible.

Thus, it is necessary to go beyond the designation of critical areas with another level of protection. The logical follow-up to critical areas is the designation of sensitive areas which may not be quite as crucial but are still important to the County. These sensitive areas would be managed with special resource protection efforts.

Figure 6

## Water Problems Associated with Development



The Resource Management Plan discusses sensitive areas and notes that their "sensitivity is derived from the inability of these areas to sustain development above a certain magnitude without negative effects on the long-term integrity"<sup>17</sup> of the environment. In general, these include areas which could be allowed to develop, but where development that disregards natural features would prove unnecessarily destructive. For these sensitive areas, we have tried to look not only at their suitability for development, but more importantly at their roles in a healthy ecosystem.

Sensitive areas addressed specifically in this plan and covered in the subsections to follow include:

1. Stream protection zones
2. Areas of high erosion potential as indicated on interpretative soil maps.
3. Valuable vegetation areas.

Areas important to the maintenance of wildlife populations might also fall into this category, but the most appropriate approach to their protection in eastern Loudoun would follow from preservation of habitat which coincides with identified critical and sensitive areas. In addition, other potentially sensitive areas which cannot be fully addressed without geological information include:

1. Areas important for infiltration of stormwater and groundwater recharge.
2. Alluvial terraces and other potentially unstable landforms.
3. Special resources, including rock deposits.

#### A. Stream Protection Areas

Protection of water resources is a vital concern for both short and long term environmental quality. An evolution of federal legislation has brought about a variety of mechanisms which have, for the most part, focused on direct discharge regulation. As mentioned in the inventory, however, the major concern in eastern Loudoun County, given the types of industry and other land uses in the area, is from nonpoint pollution.

The effects of urbanization on the hydrologic cycle may be dramatic and quickly evident or subtle and incremental. Those incremental changes may prove to be the most detrimental to eastern Loudoun as the amount of natural area converted to parking lots, rooftops and streets increases steadily. Development results in alteration of natural drainage systems, restriction of infiltration and groundwater recharge and increases in stormwater runoff (See Figure 6, page 74). Ironically, the results are an increase in flooding as well as drought since stable water flows are made erratic. Increased stream flows and velocities in peak periods contribute to erosion of

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<sup>17</sup> Loudoun County Resource Management Plan (adopted May 21, 1979), p. 214

streambanks, increased sedimentation and turbidity, decreased holding capacity of water bodies and destruction of stream life.

Thus, effective water quality management must address land use and development patterns throughout each drainage basin, not merely activity in or directly adjacent to water bodies. In the words of one writer, "It is evident that water quality control is meaningless over the long pull until it is properly integrated with land use management. . . Direct land use controls are not only essential for, but are eminently compatible with, good water quality management."<sup>18</sup> A variety of programs directly and indirectly related to water resources, then, are necessary to effective protection of water quality and quantity, particularly in this rapidly growing area. The recommendations in this section for sensitive area protection work in concert with critical area management, erosion control regulations, vegetation preservation and other environmental protection techniques and land use planning tools. As soon as geology and groundwater information is available, planning to protect important recharge areas should begin to complement these other efforts.

#### Policies:

1. To assure the wise use and conservation of the County's water resources.
2. To maximize future options for water supply by protecting existing water resources beyond what current uses might mandate.
3. To minimize the costs of water treatment, stormwater retention, stream stabilization and other corrective measures necessary when development destroys natural functioning of streams and waterways.
4. To protect habitats for fish and wildlife.
5. To recognize and maintain the valuable role of stream vegetation in filtering pollutants and shading and otherwise protecting watercourses.

#### Implementation:

1. Designate 75 feet on both sides of watercourses, including intermittent streams, as sensitive areas and establish a Stream Buffer Ordinance to govern development within these sensitive zones. Study for the ordinance should include a thorough re-review of the appropriate distances from different watercourses given topographic and other characteristics and selection of various types of controls and standards to be applied. Filling, grading, removal of vegetation and other land-disturbing activities should be addressed.

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<sup>18</sup> William R. Walker, "Integrated State Land and Water Policy: Complements and Conflicts", Land Use Issues: Proceedings of a Conference, p. 25.

2. Develop a checklist of water protection issues for developers to work with. This should be geared toward making developers aware of concerns with the alteration of natural drainageways and alerting decision makers to changes in natural hydrology created by new developments.
3. In the Subdivision Ordinance, strictly limit the channelization of streams and discourage the use of any materials which increase stream velocity. Also in the Subdivision Ordinance, require the protection of natural drainage swales wherever possible.
4. Assure the maintenance of natural stream vegetation through the Stream Buffer Ordinance, tree protection measures and appropriate amendments to the existing Subdivision and Erosion Control Ordinances. Consider a mechanism for density transfer and possible density bonuses for superior design proposals.
5. Coordinate recreation planning and development of park systems with the need to protect stream courses by using appropriate stream buffers for passive recreation.
6. Assure that proper and adequate provisions be taken during the development and construction process to prevent the infestation of mosquitoes and other vectors and insects in areas of standing water.

#### B. Areas of High Erosion Potential

Naturally occurring and ongoing erosion and sedimentation, like other natural processes, is often disrupted by human actions and turned into a damaging and destructive problem. "Human occupancy of land almost always increases the rate of hill slope erosion by significant and sometimes catastrophic amounts,"<sup>19</sup> and as rural areas change to urban uses, erosion rates may increase from 50 to 50,000 tons per square mile per year.<sup>20</sup> The State of Virginia (with construction associated erosion rates above more than half of the other states)<sup>21</sup> has placed the primary responsibilities for erosion control with localities, and Loudoun has responded with its own Erosion Control Ordinance. The recommendations in this section should complement the Ordinance and provide added efficiency with a focus on particularly sensitive areas.

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<sup>19</sup> Thomas Dunne and Luna B. Leopold, Water in Planning, p. 510

<sup>20</sup> Virginia Soil and Water Conservation Commission, Virginia Erosion and Sediment Control Handbook: Standards, Criteria and Guidelines, (Richmond: Virginia Soil and Water Conservation Commission, 1974).

<sup>21</sup> An Assessment of Major Nonpoint Pollution Sources: Relative Magnitudes, Cost Effective Controls, Institutional Constraints, (Bethesda, Maryland: Booz-Allen Hamilton, 1978), p. 4-2

### Policies:

1. To encourage recognition of and respect for the natural processes which have established a delicate balance of soil loss and soil formation.
2. To minimize erosion and sedimentation by directing development away from areas which have a high potential for creating such problems.
3. To minimize the threat to water quality and stream life and the aggravation of stream bank erosion brought on by sedimentation.
4. To avoid the need for costly engineering solutions to correct erosion problems and the added cost of treating water from sediment choked streams.

### Implementation:

1. Continue to support and enforce the County's Erosion Control Ordinance, and reevaluate the ordinance to assure that it fully addresses the above goals.
2. Keep intensive development that involves earthmoving and destruction of vegetation out of areas with high erosion potential through changes to the Zoning and Subdivision Ordinances. Where a sliding scale zoning density is adopted, be certain that the density granted reflects the extent of these sensitive areas as well as any desired proffers.
3. Encourage planned district development in these areas to allow flexibility for designing around scattered problem areas. This is particularly important in eastern Loudoun where there are areas which present a mixture of conditions and where full and efficient but not reckless use of land should be encouraged.
4. As with critical slopes, require development plans to indicate areas of high erosion potential.
5. From a study of past experience with performance bonds, determine if it may be wise to scale the dollar amounts required to a more sophisticated rating of erosion potential.
6. Investigate the use of woodland and tree protection regulations and ordinances to implement the goals of this section as well as other environmental goals.
7. Begin development of hillside regulations which are geared toward controlling erosion and sedimentation and preventing slope failures. Use of slope-density scales combined with soil overlays should be

considered, and the experiences of other jurisdictions in terms of enforcement and administration as well as effectiveness should be weighed.

### C. Vegetation

Although clear-cut land may provide the easiest development sites, the continued loss of vegetation may impose community costs that far outweigh the costs of building around these natural obstacles. Woodlands and vegetation of various types contribute significantly to overall environmental quality, providing such functions as stabilization of soils, interception of runoff and moderation of weather extremes. Although much vegetation is generally sensitive to certain pollutants, some species actually absorb pollutants and help to cleanse the air. Woodlands muffle loud noises, disguise unsightly land uses and provide important wildlife habitat.

Planning must ultimately take into account all of these varied functions as well as the less tangible amenities offered by vegetation, but as a first step, this plan focuses on particularly crucial roles of trees and woodland. While the goals of the section relate to the overall protection of vegetation, the priorities for resources management are directed toward critical and sensitive areas, namely:

1. Steep slopes
2. Areas of high erosion potential
3. Land adjacent to watercourses

These special vegetation protection areas warrant separate mention despite the overlap with other management designations.

#### Policies:

1. To manage the loss of vegetation as the eastern area develops further, so that the important contributions of vegetation to control of water, air and noise pollution are not lost.
2. To protect the important visual, recreational and psychological benefits offered by wooded areas.
3. To recognize and plan for the use of existing vegetative resources in climate moderation and energy efficient community planning.
4. To approach the protection of vegetation in a comprehensive manner which focuses on the variety of roles for vegetation in the environment.
5. To protect important wildlife habitats.

### Implementation:

1. Undertake a more complete survey and inventory of vegetation in the eastern area, including to the greatest extent possible, information on type and condition of vegetation. Use such an inventory to set priorities for a comprehensive rather than piece-meal approach to tree preservation.
2. Review and revise subdivision requirements as necessary to reflect the goals of this section. Appropriate requirements and incentives for retaining valuable vegetation should be included. Replanting requirements may also be necessary to assure that vegetation is not destroyed before development plans are submitted merely to circumvent the regulations. For preservation of large stands or corridors rather than isolated small islands of vegetation and to assure equity among landowners, it may be necessary to look at density bonuses as well as density transfers for tree preservation.
3. Gear all guidelines for preservation toward the long term. Development proposals which show on paper the retention of vegetation, but in actuality assure a short life for this vegetation through other sorts of environmental degradation should not be considered in compliance with the goals of this section.
4. Involve the Virginia Division of Forestry in review of zoning and subdivision applications and other development proposals to the greatest extent possible. A representative from that agency should be involved in the development of any new regulations related to woodland and other vegetation.
5. Begin work on a Woodland and Tree Preservation Ordinance which considers the function of vegetation as well as quantity and distribution. Thorough research of similar ordinances, such as that used in Fairfax County, should be undertaken. A simplified approach will be necessary given current county resources.

### SPECIAL MANAGEMENT AREAS

#### A. Noise

In recent years, excessive noise has been recognized as a health hazard and an ever increasing form of pollution. While there is a need to protect the eastern area from all sorts of noise pollution, the major concern of the Area Plan is the noise from Dulles Airport, which was discussed in detail in the Resource Management Plan. The following goals and means of implementation follow from those discussions and touch on other significant noise

considerations (e.g., quarry and other industrial noises), in eastern Loudoun as well.

### Policies

1. To recognize "quiet" as a community resource to be valued and protected and to limit the exposure of area residents to hazardous and disruptive noise levels.
2. To help guide non-noise sensitive land uses into areas where there are high levels of noise that cannot be reasonably curtailed.
3. To assure, through careful land use planning, that the Dulles International Airport is an asset rather than a liability to eastern Loudoun.

### Implementation

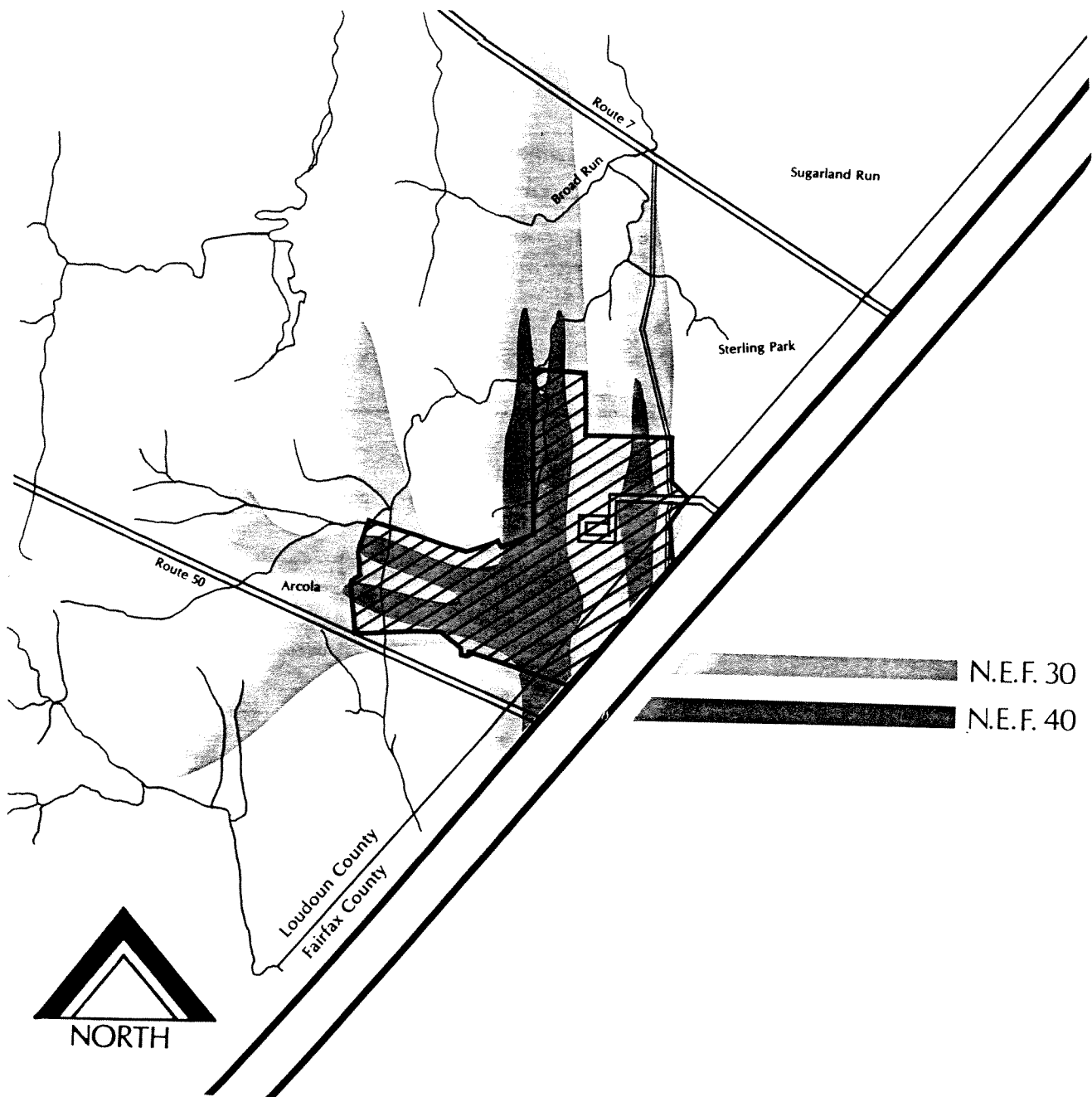
1. Assure that no area in the NEF (Noise Exposure Forecast) 40 be zoned for single-family or other residential uses. (See attached charts on noise compatibility of various land uses, Figure 7, page 82 and NEF contours in Figure 8, page 83). While in localities developing at an urban rather than suburban density, some types of multi-family rather than single-family development may be allowable, the most desirable approach for eastern Loudoun is to keep all homes out of the NEF 40 zones. Such an approach is not excessively restrictive or inconsistent with the existing land use patterns of eastern Loudoun.
2. In the NEF 30 zones, residential uses should be actively discouraged. Where residential uses are permitted, sound proofing will be required. The possible domino effect of a residential rezoning in noise-prone areas should be a primary concern in review of residential development proposals.
3. The County should pursue the idea of disclosure laws to guarantee that property buyers will be forewarned of noise levels from airport operations.
4. The County should maintain a cooperative working relationship with the Federal Aviation Administration (FAA) to assure that any further plans regarding utilization of the airport and county plans for the airport vicinity are compatible and mutually beneficial.
5. The County should move toward a gradual evolution of a comprehensive Noise Ordinance with an initial focus on industrial noise. Meaningful and enforceable standards should be developed with information from the Natural Environmental Health Association, the Environmental Protection Agency, the Virginia Health Systems Agency and other local jurisdictions.

Figure 7

# Noise Impact

LAND USE GUIDANCE CHART I: AIRPORT NOISE INTERPOLATION							
LAND USE GUIDANCE ZONES (LUG)	NOISE EXPOSURE CLASS	INPUTS: AIRCRAFT NOISE ESTIMATING METHODOLOGIES				HUD NOISE ASSESSMENT GUIDELINES	SUGGESTED NOISE CONTROLS
		L <sub>dn</sub> DAY-NIGHT AVG. SOUND LEVEL	NEF NOISE EXPOSURE FORECAST	CNR COMPOSITE NOISE RATING	CNEL COMMUNITY NOISE EQUIVALENT LEVEL		
<b>A</b>	MINIMAL EXPOSURE	0	0	0	0	"CLEARLY ACCEPTABLE"	NORMALLY REQUIRES NO SPECIAL CONSIDERATIONS
		10	10	10	10		
		55	20	90	55		
<b>B</b>	MODERATE EXPOSURE	55	20	90	55	"NORMALLY ACCEPTABLE"	LAND USE CONTROLS SHOULD BE CONSIDERED
		10	10	10	10		
		65	30	100	65		
<b>C</b>	SIGNIFICANT EXPOSURE	65	30	100	65	"NORMALLY UNACCEPTABLE"	NOISE EASEMENTS, LAND USE, AND OTHER COMPATIBILITY CONTROLS RECOMMENDED
		10	10	10	10		
		75	40	115	75		
<b>D</b>	SEVERE EXPOSURE	75	40	115	75	"CLEARLY UNACCEPTABLE"	CONTAINMENT WITHIN AIRPORT BOUNDARY OR USE OF POSITIVE COMPATIBILITY CONTROLS RECOMMENDED
		8	8	8	8		
		HIGHER	HIGHER	HIGHER	HIGHER		

Figure 8



Dulles International Airport - Noise Exposure Forecast  
Contours Post 1995

Source: U.S. Department of Transportation, Federal Aviation Administration, Environmental Impact Assessment, Master Plan Report (Final), Dulles International Airport, September 1977, Special addendum dated October 5, 1977.

6. Once standards are set, noise monitoring should begin on a spot or complaint response basis under the Department of Environmental Health. Special monitoring efforts should focus on the quarry operations in the County, not with the intent of disrupting quarry operations but to assure that residents near these industries do not suffer substantial inconveniences or long-term damages. Existing performance standards for noise and for vibration should be reviewed with the short - and long-term effects of quarries in mind, and county-initiated spot checks should begin to enforce those standards. Cooperation of industries should be sought and all quarries might be encouraged to follow the example of Luck Quarry which maintains its own monitoring records.
7. Regulations and guidelines on industrial noises should be published and made readily available to all prospective industries through the Department of Economic Development.
8. The Department of Planning and Zoning should recommend amendments to the Subdivision Ordinance to assure that buffers be required for various land uses related to noise generation as well as other considerations. The utility of ordinance flexibility to allow buffers to be designed in response to particular site considerations, such as topography and vegetation, should be explored. Study of the ordinance should also focus on the possibility of extending buffer requirements to non-industrial and land uses bordering such zones, so that the responsibility for quiet not rest solely with the industrial community.

B. Soils

A variety of problems may result from development on poorly suited soils or on sites which may not have received proper engineering evaluation. Cracked foundations and walls, premature road fatigue, and wet basements are examples of soil related problems which, unfortunately, homeowners often must deal with. The most effective and cost efficient time to deal with these problems is before design and construction. Careful analysis of soil and site conditions as part of the engineering design is the main reason for developing a soils assessment policy. All class IV soils mapping units have soil and/or site conditions that are considered to have very poor potential for general development.

Within the Class IV soil mapping unit there are five subclasses: IV-W, wetness; IV-P, soil stability; IV-R, rockland; IV-F, floodplain; IV-S steep slopes. The criteria for each of these classes as well as a county-wide classification of soils is given in the The Interpretive Guide to Soils for Planning<sup>22</sup> (Richard Weber, 1980). That document gives a rating for each mapping unit shown in the Soil Survey of Loudoun County, Virginia (Porter, et al., 1960).

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<sup>22</sup> Available in Soil Scientists and Planning Office.

The interpretative map, "Soil Potential for General Development on Central Sewer and Water", was prepared by drawing out large blocks of similarly classified soils. At the map's base scale of 1" - 3000' this map lacks the accuracy necessary for detailed planning. Detailed planning and engineering design should be based on much larger scale maps which accurately show the type of soil conditions existing on a particular parcel.

Class IV-F, Very Poor Potential - Floodplain mapping units, and IV-S, Very Poor Potential - Steep Slope mapping units are covered under Critical Environmental Areas, and therefore, are not included in this section. Although the other Class IV mapping units have soil and site potential which severely restrict or may prohibit development (see discussion of each class below), development is not altogether precluded in these mapping units. Careful study at the time of detailed site engineering is the key to environmental management in soils assessment zones. The response to a particular soils problem will not necessarily be a change to progressively lower intensity uses, e.g., large lot housing, but will be dictated by the type and severity of problems presented. For example, poor soils may, in some instances, indicate that multi-family housing on a single foundation is preferable to single-family development.

1. Plastic Soils: (IV-P)

Although many people in Loudoun County may have heard of plastic or expansive soils, shrink-swell clays, jackland or blackjack, the soil stability problems associated with these soils are probably not as well known. Also referred to as the "hidden disaster", these soils may present hardships for people locating their homes in such areas. Nationwide, one-fifth of all families live in homes on plastic soils, and no state is free from significant amounts of it.<sup>23</sup> Property damage from expansive soils totals \$1.9 billion in an average year, and may increase to \$4.5 billion by the year 2000 as pressures to develop plastic soils increase.<sup>24</sup>

Eastern Loudoun has some jackland, particularly in the southern section, but is fortunate in that plastic soils are not the major development factor they are in other parts of the County. Soil materials in this category are virtually impossible to upgrade; they may cause foundations to crack and sag, pavement to break up and roads to fail prematurely. In addition, they are unsuited for fill materials, and thus present a problem when necessary undercutting leaves large amounts of spoil to be disposed of.

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<sup>23</sup> J.H. Wiggins Company for the National Science Foundation, Building Losses from Natural Hazards: Yesterday, Today and Tomorrow, Grant No. ENV-77-08435, p. 11.

<sup>24</sup> Ibid

## 2. Wet Soils: (IV-W)

As mentioned before, there are substantial areas of flat wet soils in eastern Loudoun County. These Class IV wet soils are those in which there is a prolonged seasonal high water table, sometimes for as long as six months of the year. These soils are unstable when wet and are very difficult to drain. Failure of roads and foundations is not uncommon in these areas, and wet and flooded basements are virtually assured without proper drainage. Development which may add pollutants to stormwater runoff in such areas is an additional threat to the public health, because contamination of water resources is more likely in these wet soils.

## 3. Rocky Soils (IV-R)

Finally in this group are the Class IV rocky soils which are also included in areas with high erosion potential. This grouping generally consists of rock outcrop land and is often associated with high shrink-swell soils. Development in such areas often requires considerable blasting and may involve difficulties with proper soil compaction. When this rocky material is left in fill rather than disposed of properly, there is an added danger of crushed sewer or water pipes and breaks in basements and foundation walls.

### Policies

1. To promote a use of land which is sensitive to and coordinated with natural soil limitations.
2. To protect individual property owners from loss of property and the general public from a proliferation of development in which rapid deterioration is inevitable or highly likely.
3. To protect the County from the damaging side-effects of poorly planned or engineered development, including erosion and sedimentation, contamination of water resources and unnecessarily high costs of public service installment or maintenance.
4. To assure that areas which are naturally suited to development are protected from the introduction of soils wastes that alter that potential.
5. To provide a mechanism by which public investment decisions may be guided by consideration of development costs as well as land prices.

## Implementation

1. For all development within Class IV soils, a preliminary engineering investigation and report should be submitted at the rezoning stage. This report may be conceptual rather than detailed. A detailed engineering study must be submitted at the subdivision and/or site plan stage, setting out specifically how soils problems will be handled. On-site engineering tests may be necessary. The booklet, Interpretive Guide to Soils and Geology for Planning in Loudoun County, produced by the County Soil Scientist should be consulted by applicants for development within the designated Class IV soils: it provides background information and a basis for the detailed on-site investigations.
2. Regulations on spoil disposal should be drafted by the Department of Environmental Resources and the Department of Building and Development.
3. Where sliding scale densities are used, the level granted must reflect the severity of soils problems.

## Conclusion

In addition to the efforts directed toward particular management areas, there are environmental considerations which require responses that are less location-oriented. Some of these have already been discussed as logical outgrowths of a particular management area concept, but several of these merit separate mention. Amendments to the Zoning and Subdivision Ordinances have been mentioned frequently and deserve immediate attention. In addition, stormwater management, stream protection measures, hillside regulations, woodland and tree protection ordinances and noise regulations will all be important to the environmental quality of eastern Loudoun. While most of these will focus to some extent on particular management areas, they will also address more generalized problems and geographically diverse areas. These new regulations should be developed as quickly as possible to assure workable and effective environmental protection. Other priorities for the eastern area environment that have not been addressed specifically are discussed briefly below.

In order to track progress in maintaining and enhancing environmental quality, to anticipate possible problems and to develop effective environmental management tools, the County should have available a reliable record of environmental quality. Site specific data on trends in ambient air and water quality and storm water runoff quantity and quality. An environmental data base could conceivably involve all sorts of data, and all departments involved in environmental management, including Planning and Zoning, should begin to consider the need for maintaining an information base. Any new regulations should be formulated with an eye toward continual monitoring and data collection rather than ad hoc studies.

The top priority in terms of data collection should be focused on water quality. The Plan recognizes the undeniable link between land use and water quality, and water quality management will be approached not only through floodplain and stormwater management ordinances and stream protection regulations, but also hillside regulation, erosion control, soils assessments and other "land" centered planning tools. An important counterpart of these efforts is water quality monitoring, and efforts should be made to expand the County's capabilities for monitoring water quantity and quality. At the same time, the County should actively seek support from the State, the appropriate federal agencies and regional planning organizations, if not to initiate new data collection, then at least to better coordinate existing programs with local information needs.

Similar to the need for monitoring capabilities discussed earlier is a very pressing need for inspection and enforcement capability. Many of the regulations proposed require substantial inspection and enforcement activities, and while new ordinances should be tailored to Loudoun's resources, the teeth to back up environmental requirements will be necessary. A reasonable expansion of such resources is crucial to a meaningful environmental management program.

The County's cooperation with regional planning efforts is another necessity. Although eastern Loudoun County is substantially different from its metropolitan neighbors, it does share many similar concerns, can learn from others' experiences and must address environmental problems from a regional perspective. The County has been actively involved in regional efforts to improve environmental quality and should continue to support important regional programs.

An impact assessment process is another important tool for planning purposes in the County and is vital to the community in assessing not only if, but how a particular development will occur. Nonetheless, the impact assessment process is not a substitute for comprehensive planning, and a framework of environmental principles is a prerequisite to an impact measurement scheme. A cumulative view of environmental changes is necessary if the individual impact assessments are to be fully beneficial. An environmental program relying solely on impact assessment is very likely to thwart long-term environmental goals, particularly when impact will be considered for generally small development projects.

The County should begin work on an impact assessment process which relates directly to the specific goals and policies identified in the Plan. Study of experiences with impact assessment in other areas should concentrate not only on how to estimate impacts, but also, and perhaps more importantly, on how to use that information. Initial work with an assessment process should build on the current referral process used for zoning and subdivision applications.

Another program to pursue for the future would be one of public acquisition and utilization of important environmental resources. Although the term acquisition may immediately arouse anxieties because public monies are involved, it will be necessary at some point to weigh the costs of acquisition with the costs of

environmental losses. Regulation and guidance of development will do much to prevent environmental degradation and public harm, but some of the area's less crucial but nonetheless, valuable environmental resources may require protection based on shared public cost. This plan does not call for acquisition of any resources at this point, but recommends that resources in eastern Loudoun be evaluated along with other county resources in terms of need and desire for protection, imminent threats, functions and amenities. If such an effort were initiated, priorities for protection could be set and the County could preserve its special environmental quality with a cost effective openly discussed and reasoned program. This would contrast with the situation in many areas where preservation efforts may be erratic and often centered around a crisis requiring hasty response.

It is important that sensible, well-planned environmental management is followed by the County itself in any new programs and purchases. The various county agencies should set the standard for environmental protection; in the eastern areas this is of particular importance because of the relatively rapid development. With the County's example of respect for the environment, the initiation of new environmental regulations and the targeting of protection measures to different management areas, the overall environmental quality of eastern Loudoun may be protected and enhanced.

## **COMMUNITY DESIGN**

### **INTRODUCTION**

Community design is a term which refers to the character of the physical structure and organization of a community, which would include habitable structures, transportation elements, open space areas, and the complex network of relationships between these diverse elements. The primary focus and concern of the community design process is to allow new development to be organized in such a way as to enhance community identity, promote energy conservation and to preserve the existing natural amenities as described in the Resource Management Plan.

The tools of community design efforts are primarily those of physical design, i.e., the choice of road patterns, the selection of sites for open space preservation and the relationship of these to residential and commercial developments, and the site design features that are implemented in all physical developments, including the architectural character of buildings and their relationship to open spaces and transport networks. Community design, in a sense, deals with the same problems of space, scale and circulation that architectural design deals with. The difference is that architectural design focuses on the relationship of spaces in a particular building, whereas community design focuses on the relationship between many different buildings and structures. (See Figure 1 and 2, pages 91 and 92).

The purpose of the community design portion of the area plan is to provide a guide for focusing efforts to improve the overall design quality of new development.

There are three major areas of concern with regard to the character and quality of community design in eastern Loudoun. These are open space, relationships of buildings and structures, and the circulation network.

Open space is an essential and integral part of eastern Loudoun's community design. The open space land use elements overlap in function with several other kinds of land use, including parks and recreation, historic areas, environmentally critical areas and buffers for community identity. Each of these open space elements has a particular purpose, in addition to the purely aesthetic function of scenic beauty. In general, open space deals with the transition areas between communities, and those natural and scenic areas in eastern Loudoun which the citizens of the area feel should be preserved.

Relationships of buildings and structures to each other is an important aspect of the community in terms of aesthetics, human scale, energy efficiency and the overall visual and cultural character of an area. The relationships between buildings have a large and interacting effect on the circulation network of a community as well. Examples of issues and elements of structural relationships include: setbacks of buildings from the street, height and mass of buildings, outdoor public spaces and their relationship to private outdoor space, density of buildings in terms of units per acre, solar orientation and functional relationships such as the proximity of one type of land use to another.

Figure 1

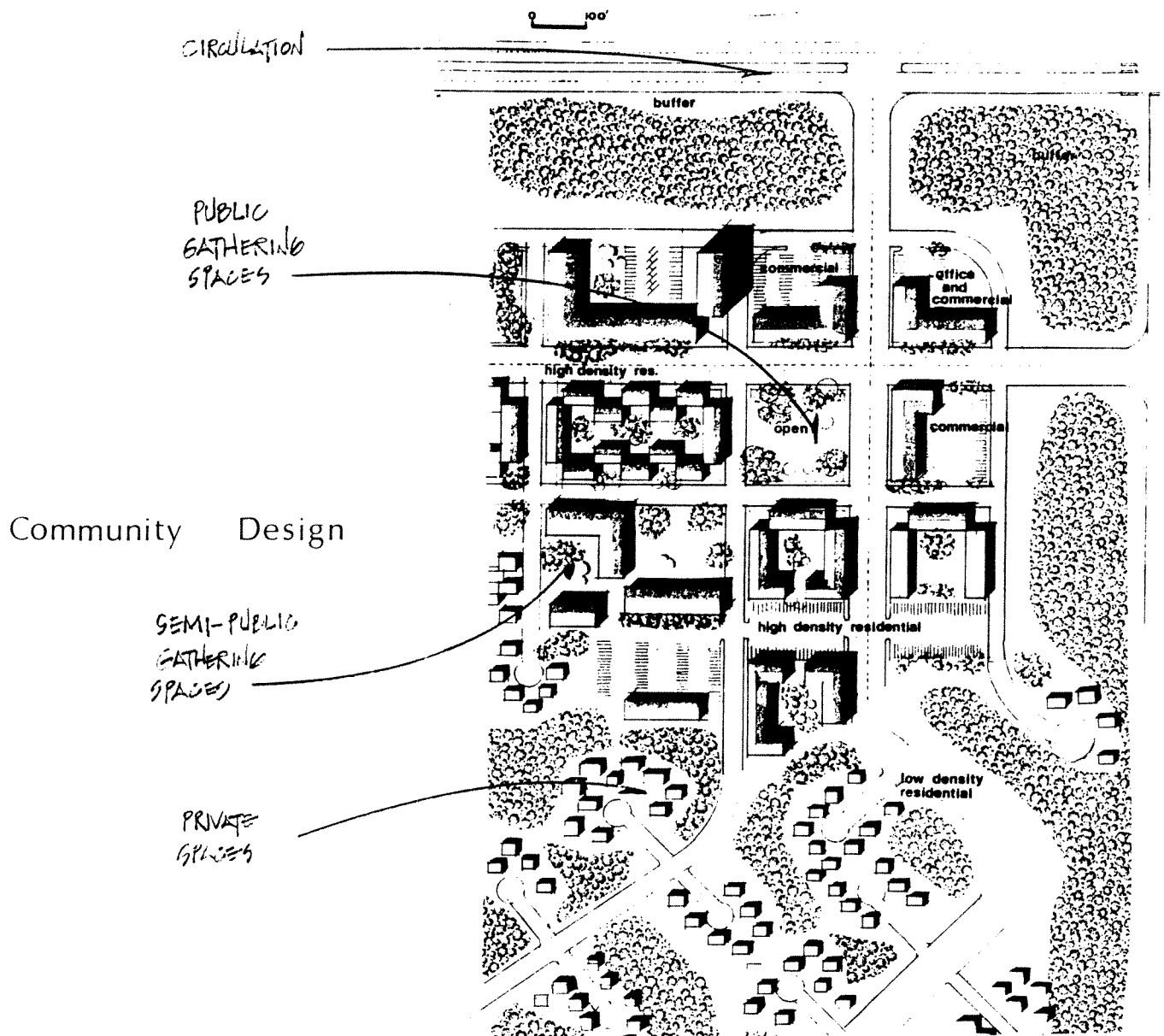
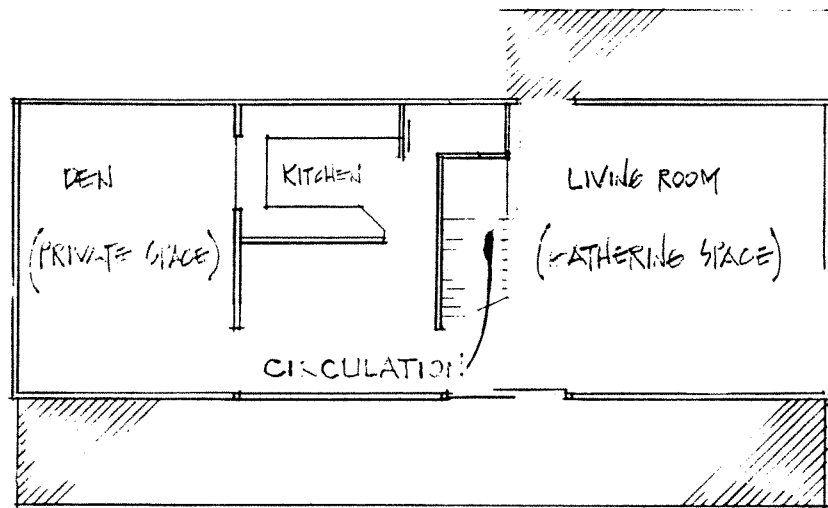


Figure 2



Architectural Design

The circulation network is the total transportation system of the community, including roads, highways, trails, and sidewalks. The critical aspects of this complex network are the relationship of the different parts to each other, i.e., highways to pedestrian sidewalks, the quality and character of these elements, i.e., the width and surface quality of roads and trails, the functional efficiency, i.e., capacity and routes of roads, and the relationship of all these transport elements to the buildings where citizens live and work.

## POLICIES

The following policies are aimed at providing a direction for the County to take with regard to programs, regulations and other actions involving the character and quality of community design and preservation of open space in the eastern Loudoun area. They set the framework for more detailed program recommendations. These policies are oriented specifically toward the concerns of eastern Loudoun, but they are derived from the general goals and policies stated in the Resource Management Plan.

### A. Open Space

The County will:

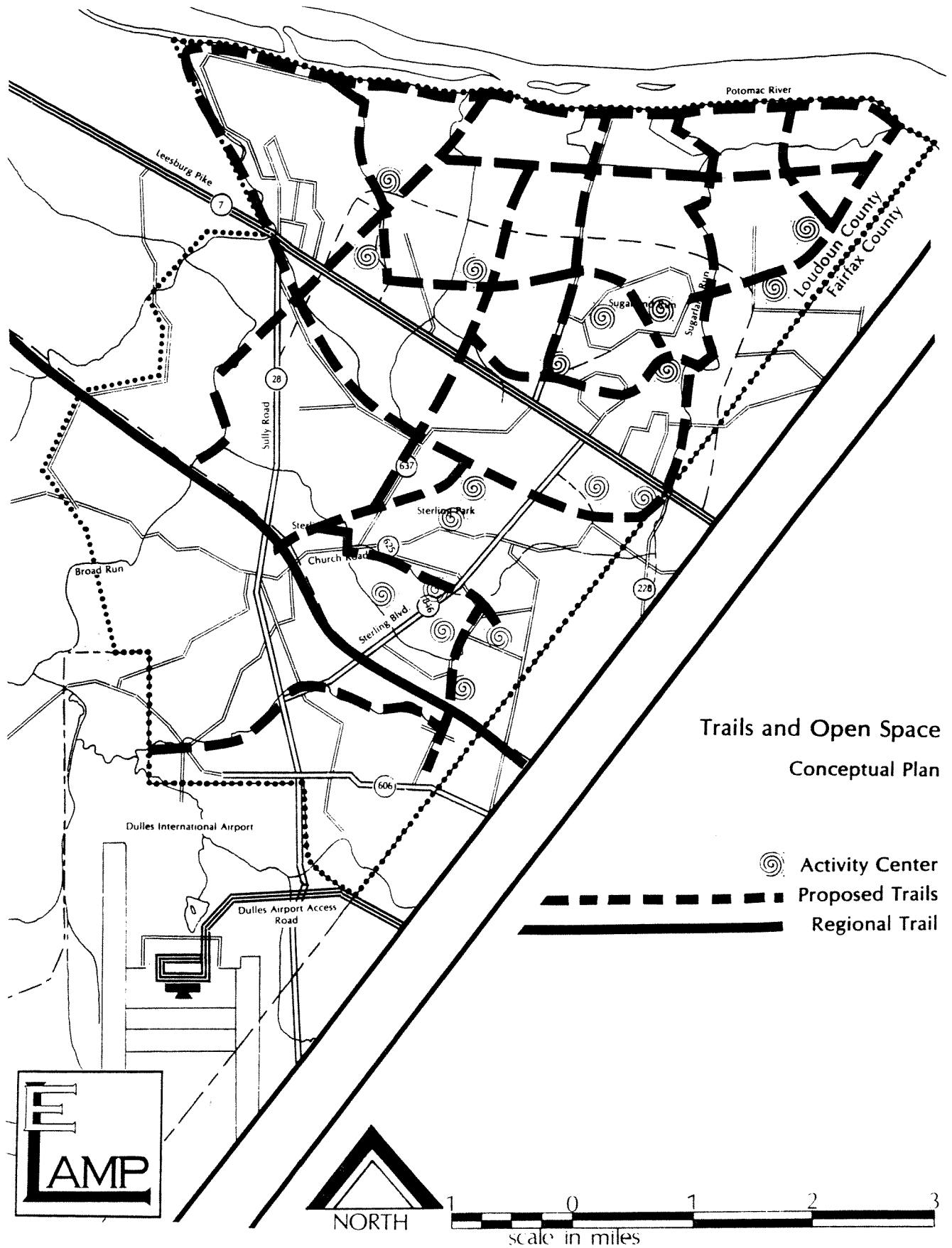
1. Reserve the land needed for future open space preserves and trails as soon as possible in order to assure the lowest possible cost. The first priority is acquisition, second priority is construction of facilities when in the process of establishing an open space system.
2. Provide incentives for developers to proffer or otherwise dedicate open space lands in areas designated in the Eastern Loudoun Area Plan. (Figure 3, page 94).
3. Wherever possible, use environmentally critical lands for open space buffers, between communities.
4. Require open space buffers between clusters of residential units in order to establish the visual identity of each residential cluster.

### B. Relationships of buildings and structures

The County will:

1. Encourage the preservation of the visual identity of new and existing communities and neighborhoods.
2. Encourage the preservation of the basic scenic character of the landscape when building new developments by reacting sensitively to existing topography and vegetation during the design and construction process.

Figure 3



3. Encourage the creation of new developments which conserve the existing natural environment and which are efficient and economical in terms of energy consumption.
4. Encourage the creation of new developments which incorporate design practices that keep construction and development costs to a minimum while still meeting the objectives of preserving the scenic, social and environmental character of the community.

#### C. Circulation Network

The County will:

1. Encourage the creation of compact, efficient, people-oriented communities which allow for mixed-use developments, pedestrian and bicycle transportation, and nearby employment centers for residents.
2. Encourage the establishment of a safe and pleasant comprehensive pedestrian system which can effectively supplement the road system and which will link activity areas such as schools, commercial centers and community centers.
3. Encourage innovative solutions to the problems of road and highway design, particularly with regard to achieving lower costs, high visual quality and preservation of important existing vegetation.

### ANALYSIS

#### A. Open Space

Currently, the eastern Loudoun area has a large amount of open space which can become a creative element in the area's community design and character. However, for the most part, this open space exists in an undeveloped state simply because development has not taken place on it as yet, not because it has been planned or preserved as open space. In effect, most of the open space in eastern Loudoun has been "left over" from past development. There are, of course, several major elements in eastern Loudoun which represent the kind of open space features which this plan recommends should be established in the area. These include the following:

1. Algonkian Regional Park

This park site is used for both active and passive recreation. It holds a strategic location on the shore of the Potomac River. Approximately 600 acres.

2. Claude Moore Conservation Education Center and Historic Farm

Formerly property of the National Wildlife Federation, now Claude Moore Park, this site is a wildlife sanctuary, consisting largely of woodland. 357.2 acres.

3. Washington and Old Dominion Regional Trail

The bed of the old railway is owned by the Northern Virginia Regional Park Authority and is the major east-west regional, multi-use trail in northern Virginia, connecting Purcellville with Alexandria.

4. Vestals Gap Road (refer to Heritage Conservation Plan, page 274.)

Although this historic road coincides in part with Route 638, the County still owns part of the right-of-way on the segment which passes through Sterling Park. This road connects two points of Route 7 and several areas in Sterling Park with the property of the National Wildlife Federation; thus, it has excellent potential for use as a linear park-multi-use trail. Route 604 should allow sufficient right-of-way for the expansion of Vestals Gap Road (Class 1 Bikeway).

5. Sterling Park Golf Swim and Tennis Club

This is a good example of one effective way of preserving open space by establishing an active recreation facility that retains the basic open space character of a site. Privately owned and operated.

However, such uses must be provided in relation to a clear demand on the part of potential users.

6. School Sites

There are several existing school sites in eastern Loudoun (see School section of Public Facilities Plan, page 218) and these are an excellent source of open space preservation. However, the criteria for school sites are based more on access, transportation, proximity and topography than on scenic quality or vistas. But in many instances, the criteria for establishing school sites relates strongly to those for open space, i.e., pedestrian access, suitable topography for active use such as ball fields, proximity to residential neighborhoods, etc.

7. Potomac Trail

The Northern Virginia Regional Park Authority is in the process of acquiring lands along the Potomac River Floodplain to form a trail running from Fairfax to Leesburg. The Park Authority has acquired

several easements to date, and should eventually be in a position to build a continuous trail along the river.

8. Open Space Reservations in the Cascades and CountrySide Developments

The new developments of CountrySide and Cascades have allocated substantial amounts of land as open space, including school sites, floodplains, equestrian areas and athletic fields.

9. Sugarland Run and Broad Run Creeks and Floodplains

A substantial amount of land along the Broad Run and Sugarland Run Creeks lies within the 100 year floodplain. This land will not be developed and will continue to be a major open space resource for eastern Loudoun.

There are other open space elements in eastern Loudoun in addition to these, such as the property in the Sugarland Run community which is owned by that homeowners' association. These elements are significant in that they represent the kind of acquisition and ownership process (by homeowners' associations and other private groups) which the County should encourage as a means of acquiring and maintaining open space. The most important open spaces in eastern Loudoun, however, are the vast areas which have not yet been developed, but which most certainly will be developed in the future. This undeveloped area includes 75% of eastern Loudoun or approximately 14,000 acres. This land is one of eastern Loudoun's most important resources and should be managed in accordance with the policies and recommendations of this plan.

The following table indicates how these various types of open spaces can be organized and constructed to help form the community design concept for eastern Loudoun.

TABLE 1		
EXISTING OPEN SPACE ELEMENTS		
OPEN SPACE ELEMENT	EXAMPLE	PURPOSE
1. Parks for active recreation	Ball fields such those at Park View High School	Active, intense recreational activity
2. Parks for passive recreation	Multi-use trails (linear parks) such as W&OD, nature trails, wildlife sanctuaries such as that of Claude Moore Park	Active and passive recreation, education, transportation
3. Scenic areas	Woodlands, streams, vistas	Passive recreation, visual amenity
4. Environmentally critical areas	Floodplains, steep slopes as indicated in Environmental section, Figure 5, page 71 particularly the vicinity of Sugarland Run	Preserve the function of the ecosystem
5. Community and neighborhoods buffers	Green belts, trails as indicated in Figure 3, page 94	Establish, preserve and reinforce the identity of a community or neighborhoods and provide options for future development.

Figure 3, page 94 provides an illustration of how the open spaces of eastern Loudoun should be organized and interrelated to provide a framework for community design policies.

B. Relationship of Buildings, and Circulation Network

To date, there has been virtually no coordinated study or effort made toward understanding or developing a sound approach to community design in eastern Loudoun County. This is primarily due to the fact that the area has been rural and suburban in character, with new development being undertaken by independent builders operating in a "vacuum".

The form of human settlements has evolved naturally, guided primarily by the forces of economics and transportation. But as communities become more densely populated, the need for a comprehensive, integrated approach to coordinating the design of new developments becomes more important. The

eastern part of the County has reached the point where a comprehensive design approach is necessary in order to assure a well balanced, efficient, aesthetically pleasing and coordinated physical community design.

With the exception of the guidelines provided by the County's zoning and subdivision ordinances, community design in the eastern Loudoun area has to date been relatively uncoordinated. There are, of course, examples of successful efforts, but in general, the independent, isolated and unplanned pattern of development has produced problems of pedestrian access, lack of community identity, energy inefficiency and poor visual quality due to destruction of vegetation, large-scale roads and illogical site planning. The eastern Loudoun community still has an opportunity to achieve a high level of design quality.

New developments must be planned and designed in relation to each other and in relation to the existing neighborhoods. The principles set forth in this plan must be adhered to as closely as possible in all future developments.

The current character of community design in eastern Loudoun can be described as low to medium density "*suburban*" development. There are both positive and negative design and organizational features to be found in the area. Examples of positive elements include the following:

1. There are two large planned unit developments (*P.U.D.*) which represent an attempt to achieve organized, convenient and identifiable neighborhoods. These are Sterling Park and Sugarland Run. They include community facilities and commercial developments within the neighborhoods.
2. The major highways in eastern Loudoun (*Routes 28 and 7*), are relatively unspoiled in terms of their visual quality. Most development has taken place away from these major roads.
3. The W&OD Railroad right-of-way has been acquired by the Regional Park Authority for the future construction of a regional, multi-use trail, connecting Purcellville with Alexandria, and points in between.
4. Pedestrian circulation is good in some neighborhoods of eastern Loudoun. Many pathways and sidewalks have been constructed. However, many commercial and public facilities remain relatively inaccessible by foot or bicycle.
5. The Algonkian Parkway is in a location which allows maximum use of the Potomac River and which allows a future regional trail along the river to connect to it. Property for the trail is in the process of being assembled by the Northern Virginia Regional Park Authority.

6. A large amount of land in eastern Loudoun remains undeveloped, and thus offers tremendous opportunity for the future development to enhance community identity, design quality, and energy conservation.
7. Some developments such as Forest Ridge, have saved a considerable number of trees during the construction process.

Eastern Loudoun has many of the negative aspects that are common in contemporary design. They include the following:

1. As the Sterling Park and Herndon areas have grown, they have begun to merge, creating a sprawling growth pattern, thus losing their visual identity as separate and distinct communities.
2. Although there is a substantial existing pedestrian circulation system in eastern Loudoun, many areas, particularly the major commercial centers, are practically inaccessible by foot or bicycle.
3. There is no true, clear community focus in the eastern area.
4. Most developers of new residential areas have applied the practice of clear-cutting the existing woodlands on a site in order to make the construction process simpler and easier. This reduces the visual quality of these neighborhoods and also prevents residents from experiencing the benefits of tree shade for energy conservation.
5. Virtually all development in eastern Loudoun is segregated by use. That is, commercial facilities are separated from residential areas, offices separated from retail stores, etc. Often, the only way to get from one use to the other, even when they are adjacent, is by auto. (*Example: the Town Center Shopping Center*). Planned residential development should have integrated land uses to promote the establishment of traditional growth patterns.
6. The quality of the architectural design of many commercial buildings in the eastern area is not compatible with the traditional character of public and commercial architecture in the area. This new development tends to reduce the visual quality of commercial centers and further stimulate the trend toward segregating these uses from residential areas.

The architecture of downtown Leesburg is a positive example of what can be done. There, commercial shops, offices and residential townhouses all have a very similar design character.

7. The architectural design and site planning of most residential developments in eastern Loudoun have not adequately taken into consideration or applied such features as proper orientation for energy conservation, road design which will keep auto speeds to a minimum, adequate trail systems, efficient location of window and door openings in houses, landscaping for energy conservation and other similar design elements.

The problems and possibilities for planning a viable community design for eastern Loudoun are complicated and challenging. The policies and recommendations in this plan are aimed at helping to produce a coordinated and innovative approach to community design.

## **POLICIES AND PRINCIPLES**

The following principles and policies are intended to serve as a basis for future action on the part of the County. These will include suggested modifications of the zoning and subdivision ordinances, as well as guidelines for developers to follow during the design and construction stages of new developments.

### **A. Zoning and Subdivision Ordinance Modifications:**

1. Develop detailed site planning standards for all residential, commercial and industrial developments. These standards shall require the implementation of design elements that will reinforce and support the County's community design policies. Examples of some conceptual elements include: clustered housing units, proper landscaping and woodland retention for energy conservation, and proper siting and sun orientation.
2. Detailed open space specifications for public and private open space will be developed at a later date.
3. Provide density bonuses for private developers who implement any or all of the following design concepts:
  - a. Mixed-use development of commercial, office and residential uses.
  - b. Donation of scenic easements or similar restrictive covenants on the open space areas designated in the area plan.
  - c. Functional pedestrian and bicycle circulation system which does not conflict with auto traffic.

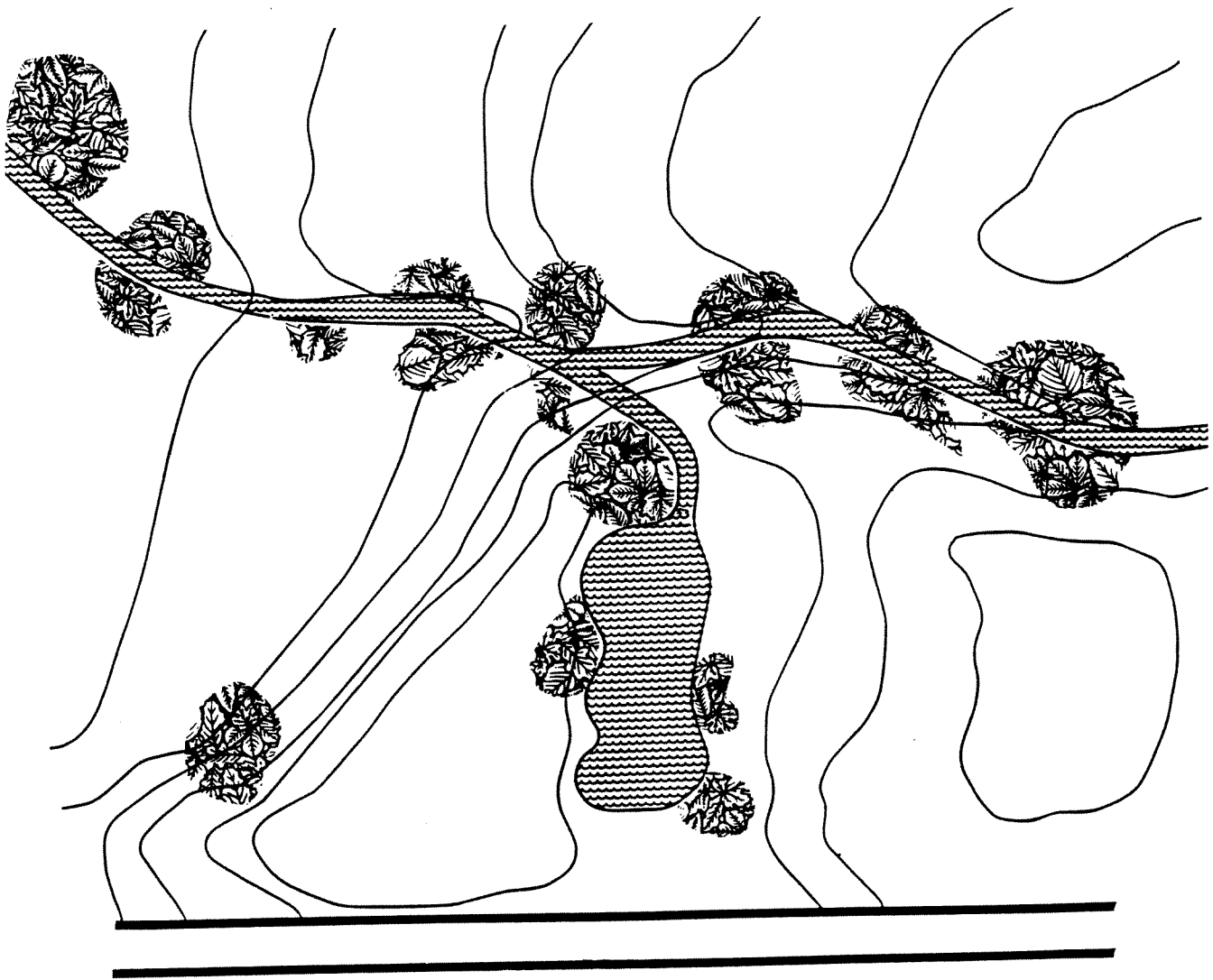
- d. Energy-efficient design of all buildings including proper siting and orientation, use of efficient materials, efficient opening sizes and location, minimal use of paving, and substantial, properly designed landscaping.
4. After detailed standards are developed, the following features should be included in the Zoning and Subdivision Ordinances as requirements or as items for which the developer can receive density bonuses:
- a. Clustered housing units (*See Figures 4, 5, & 6 pages 103-105*).
  - b. Proper landscaping for energy conservation (*required*).
  - c. Pedestrian and bicycle trail system that links activity centers.
  - d. Woodland retention (*give density bonus as incentive*).
  - e. Building design for energy conservation such as minimal paving, proper window openings, energy efficient construction materials (*See energy section*).
  - f. Greenbelt areas (*easements and restrictive covenants*) (*give density bonus*) (*See Figure 3, page 94 and Figure 8, page 107*).
  - g. Mixed-use designs (*give density bonus*).

B. Neighborhood Design Principles:

The following are principles which should be encouraged by the County and written into Ordinances where possible:

- 1. Connect activity centers in commercial and residential areas with a convenient trail system which ties into an overall community trail system. (*See Figures 7 and 8, pages 106 and 107*).
- 2. Trail system and highway system should not conflict. Trails and bicycle paths should meet either Class I or Class II Standards. (*See Figure 3, of Transportation Plan, page 179*).
- 3. Orient buildings for maximum southern exposure (*See Energy Plan*). (*See Figure 9, page 109*).
- 4. Provide or retain deciduous vegetation on the southern exposure for buildings (*See Figure 9, page 109*).

Figure 4

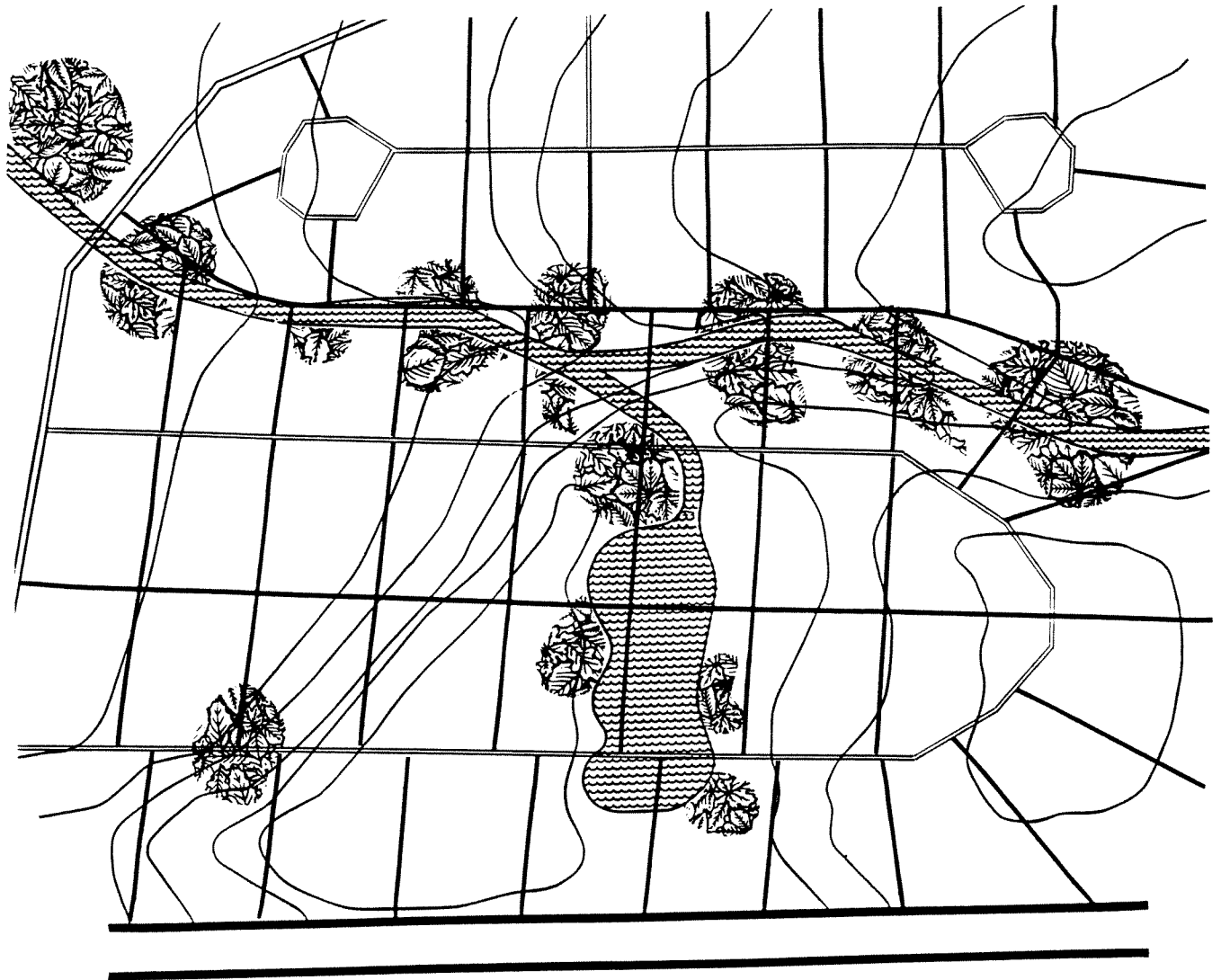


### The Land

A site typical of Loudoun County with:  
Year around streams and pond  
Gentle hills and ridges  
Some steep areas  
Some soils suitable for building . . . some not  
Attractive woods and fields  
Access from a busy road

Cluster Development Technique

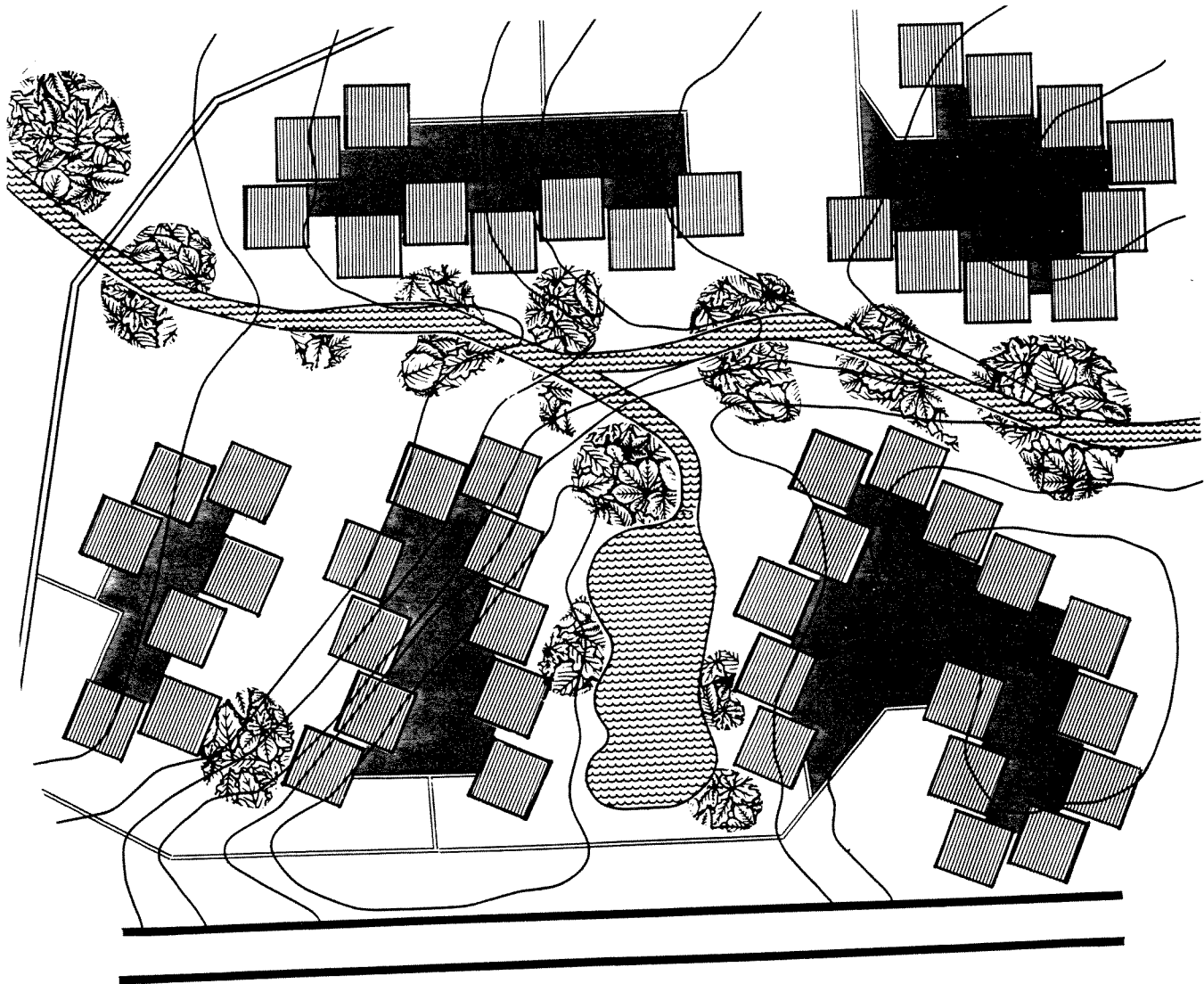
Figure 5



### Typical Subdivision

Monotonous rows of houses  
Many natural features destroyed  
No open spaces - pond drained, stream underground  
No recreational opportunities  
Yards back to back  
Encroachment on water bodies  
Houses often unsuitably located  
One housing type . . . limits cross section of families  
and social mix.

Figure 6



### Cluster

Relief from Monotonous Development  
Natural features preserved  
Open space provides recreation  
Yards open onto open space  
Road system contributes to privacy and safety  
Water bodies protected . . . and enjoyed  
Houses located on best sites  
Permits varied housing types by cluster grouping . . .  
attracting a cross-section of family types for  
better social mix . . . young families, older  
couples, etc.

Cluster Development Technique

Figure 7

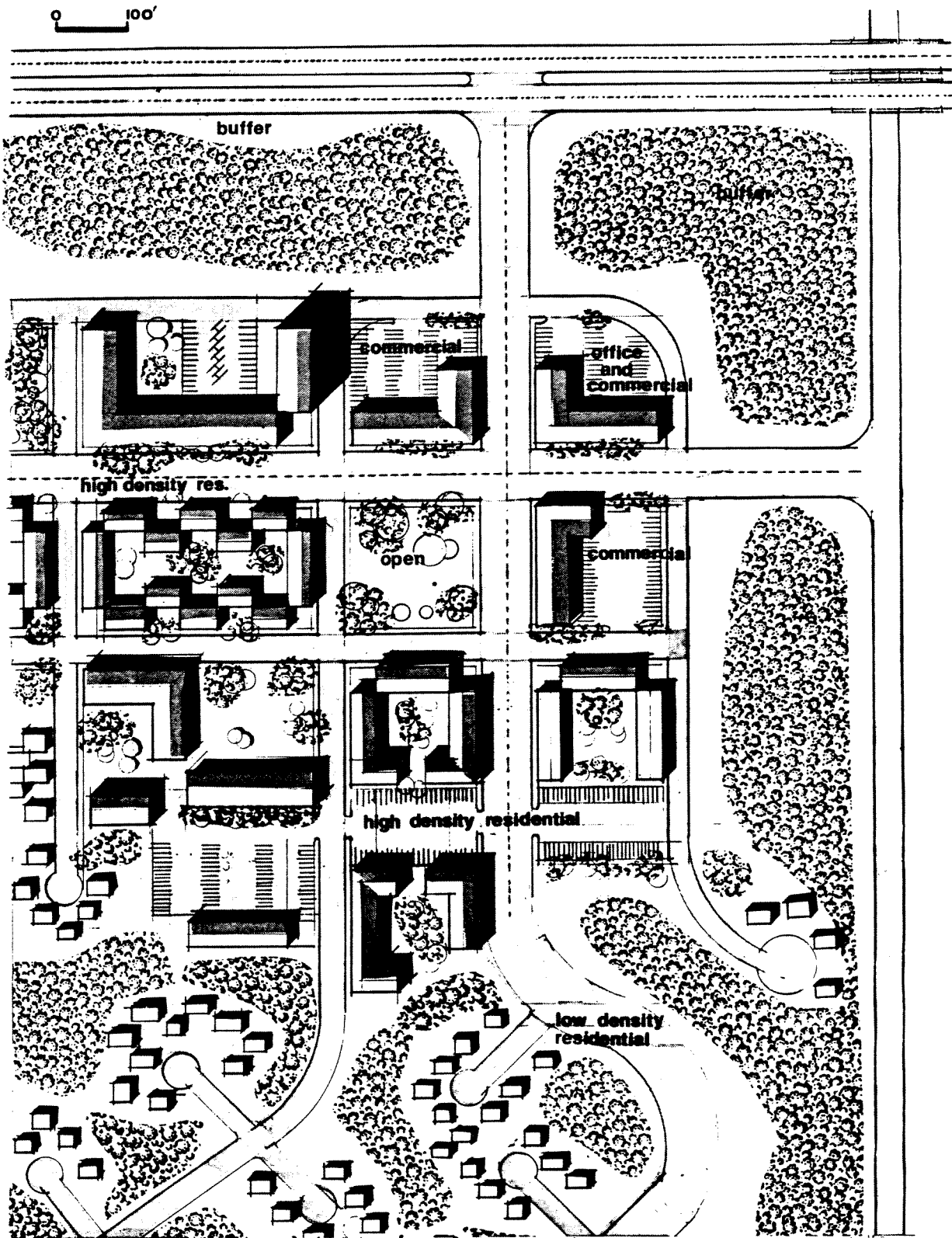


Illustration of Community Design Principles

Figure 8

## Relationship of Community Design Elements

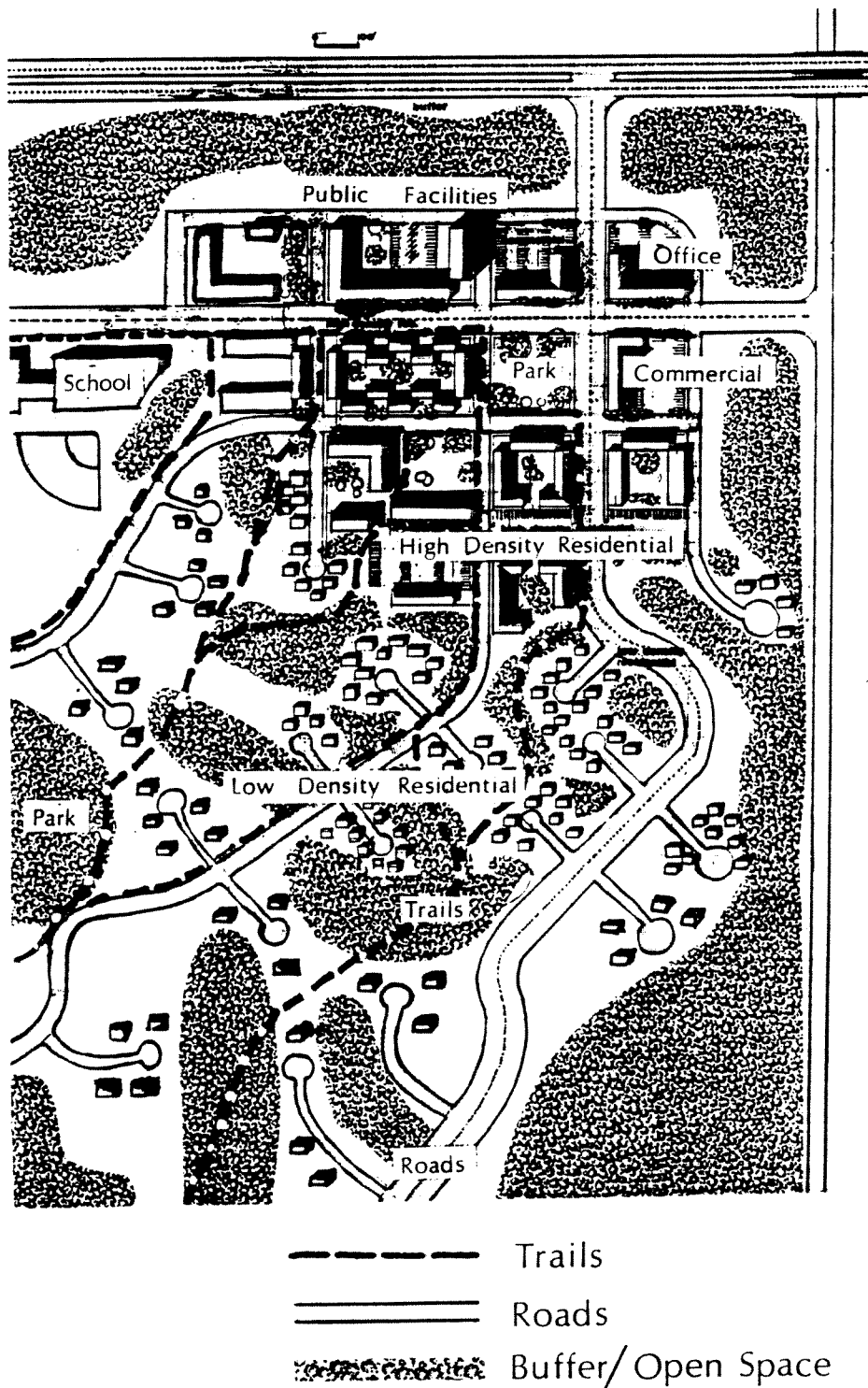
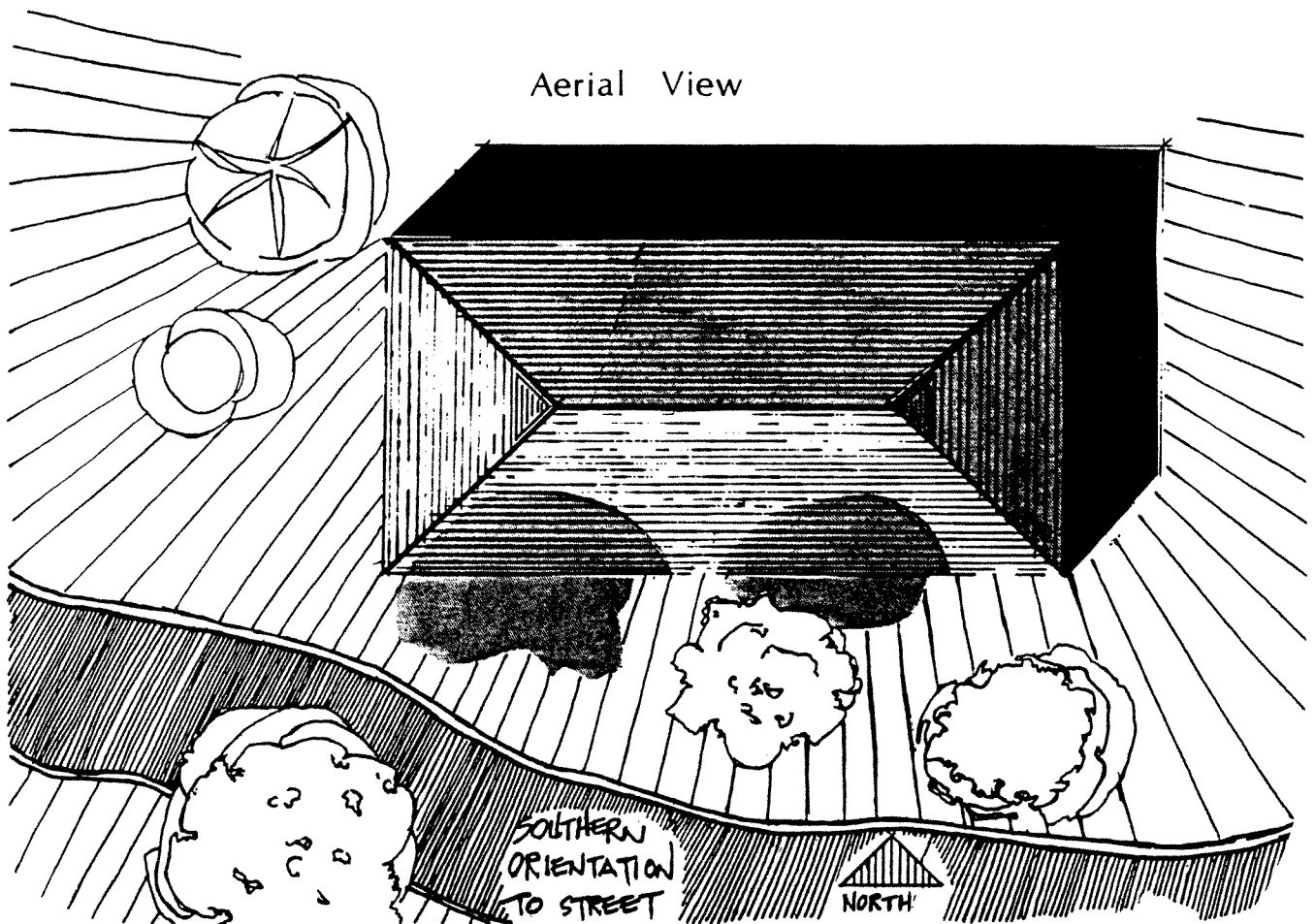
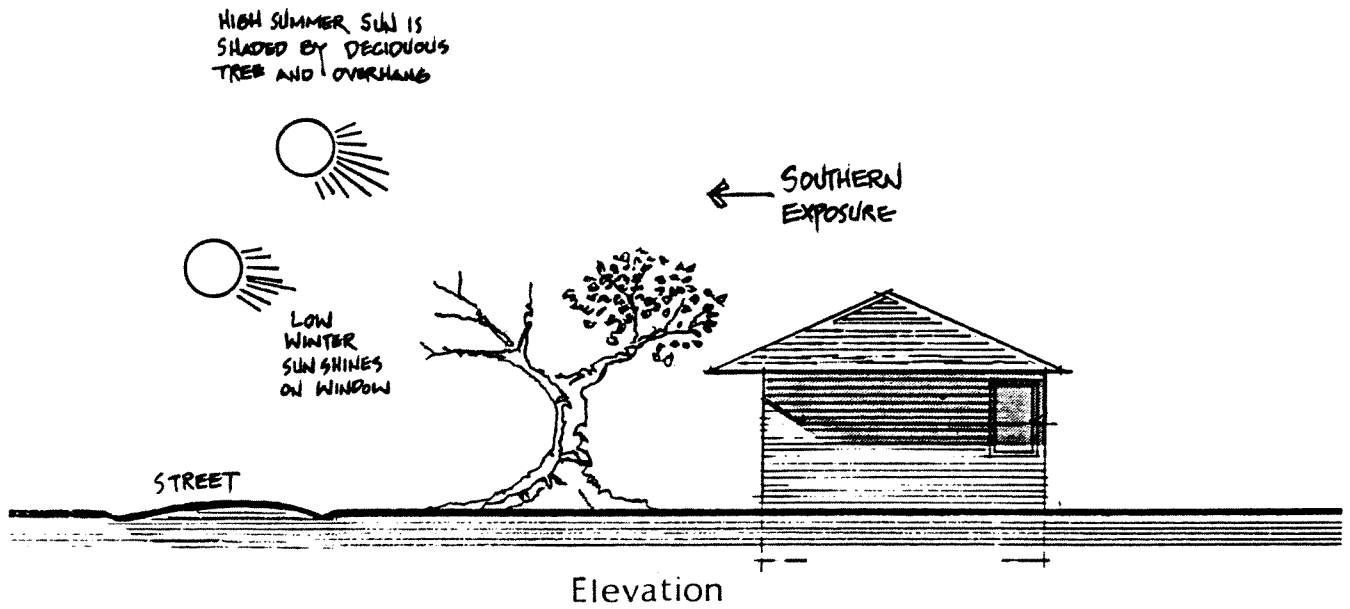


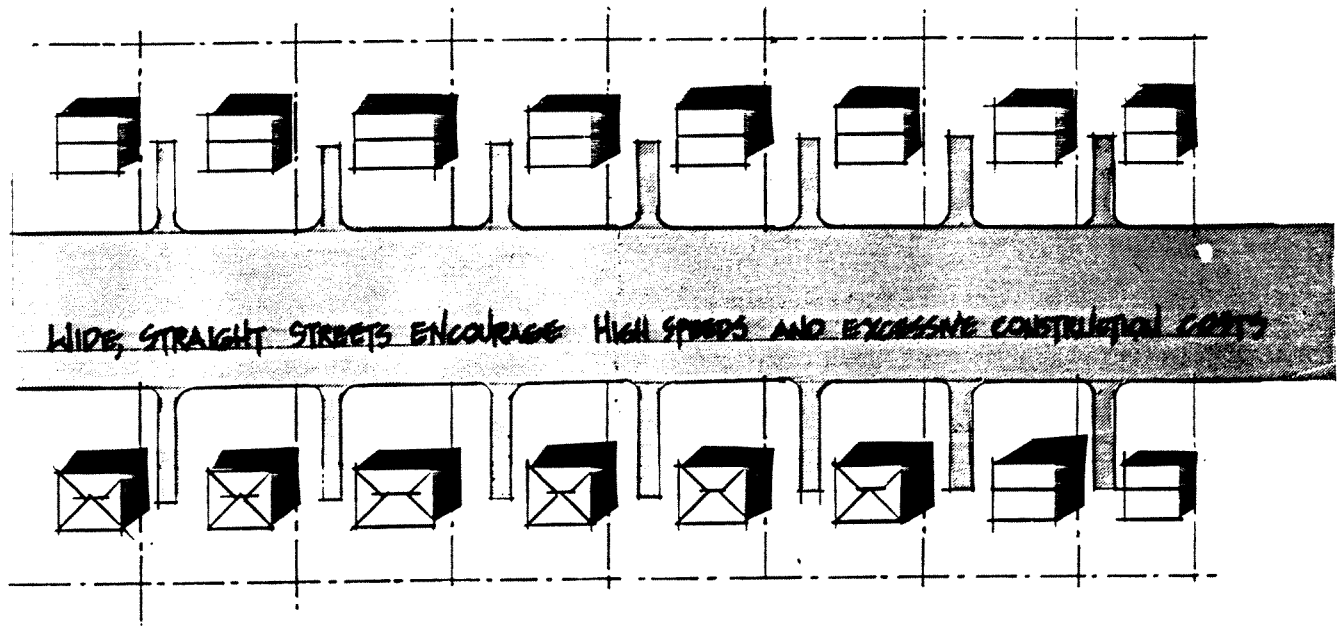
Figure 9

## Orientation For Energy Conservation

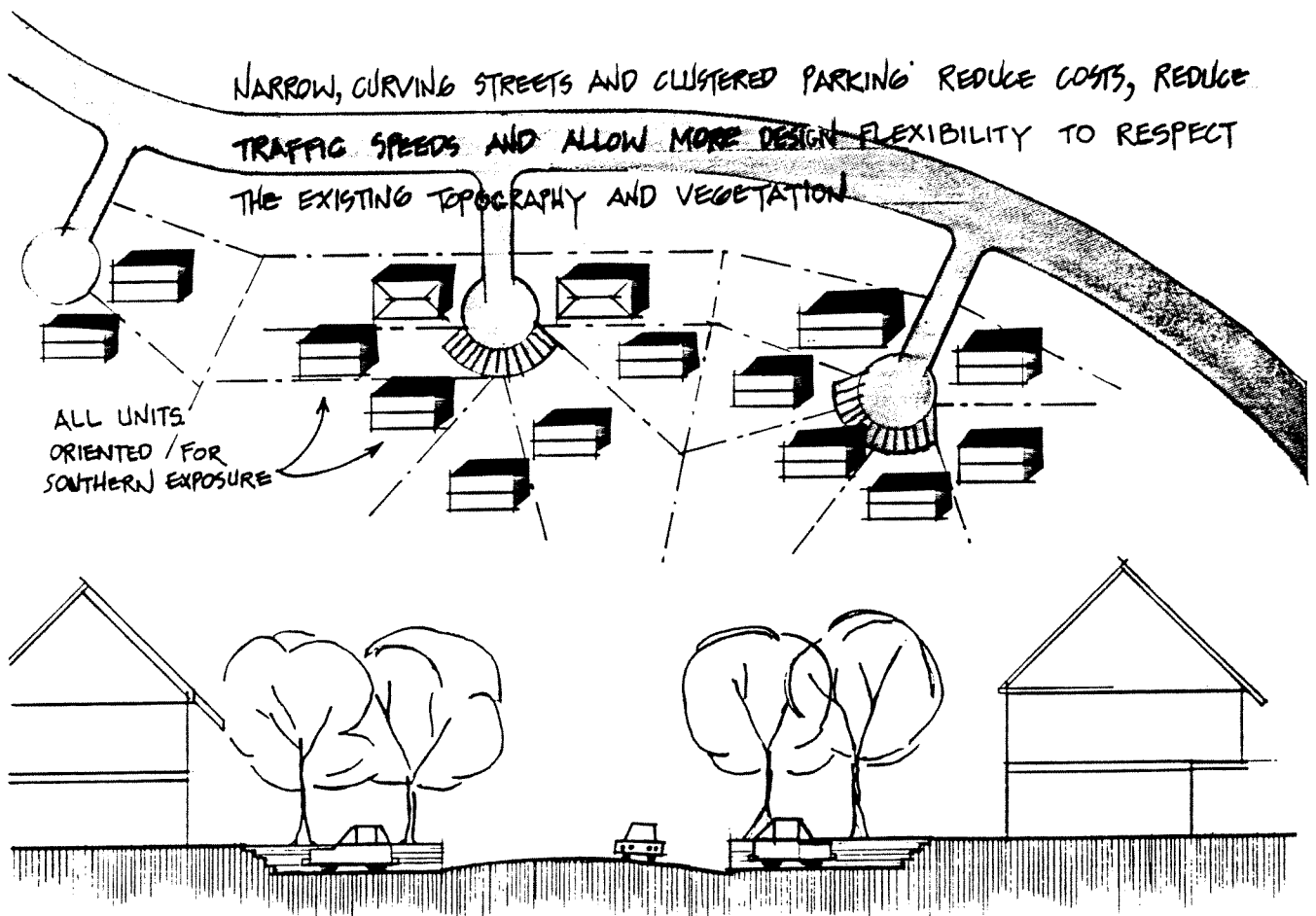


5. With the assistance and cooperation of the VDOT, residential roads (*not including collectors and arterials*) should be kept to minimum widths. These roads should be designed to meet the needs of the residents, in terms of fitting into existing topography and vegetation, providing for expected traffic flows, minimizing costs and energy use, reducing vehicle speeds, and reinforcing the pedestrian character of residential neighborhoods.
6. Provide or retain deciduous and/or coniferous vegetation along all roads. The County should develop and adopt a Highway Vegetation Ordinance.
7. Wherever possible, residential dwelling units should front on cul-de-sacs rather than collector roads.
8. Cluster single-family dwellings into small groups in order to preserve open space (*See Figure 6, page 105*).
9. Preserved open space should be usable. It should be defined space, enclosed on two or three sides by buildings. There should be no "leftover" spaces except those which are designed to be preserved as natural, environmental areas. (*See Figure 10, page 110*).
10. Parking for every type of residential and commercial structure should be clustered, landscaped, and grade separated where possible (*See Figure 10, page 110*). Such requirements should be defined in a County adopted site plan Ordinance.
11. Each major community (*8,000 - 10,000 people*), should have a community focus as a "center" of identity and social and commercial activity. The center should be modeled after the patterns of the historic villages in the County. It should have a central "square" core area which is strongly defined by pedestrian streets with small scale buildings containing commercial uses on the ground floor and offices or apartments on the top floor. Medium/high density residential areas should surround the community center as a transition between commercial and low density residential uses. The entire community should be separated from other communities by a greenbelt buffer of trails, streams valleys, floodplains, and other open space and environmentally critical areas. (*See Figure 8, page 107*).
12. Where possible, electric power and telephone lines, should be beneath grade. An Ordinance for underground utilities should be developed and adopted.

Figure 10



## Street & Parking Design



WHERE POSSIBLE, PARKING SHOULD BE CLUSTERED, LANDSCAPED AND RECEIVED

13. Residential dwelling units should be carefully and efficiently designed so that they may be as small as possible in terms of enclosed volume and area. This will keep housing costs down and allow builders to incorporate higher quality materials. Appropriate amendments to the County Building Code should be adopted to meet these needs.
14. Dwelling units should incorporate reverse frontage on major arterial/collector roads. Service roads should not be used.
15. Earthen berms, planted with vegetative ground cover to control erosion, should be built at the edges of distinct neighborhoods and clusters in order to provide visual and audio separation between adjacent neighborhoods and between roads and residential structures. Such berms should react sensitively to existing topography and vegetation.

C. Open Space Policies

The following are specific actions which the County can take toward establishing a viable open space system in eastern Loudoun:

1. Allocate County funds for the development of linear parks (*trails*) on the same basis as for conventional recreational parks. Linear parks (*connecting trails, rather than trails within a subdivision*) should receive equal funding consideration to that of active parks.
2. Encourage volunteer groups to assist with fund raising and construction labor for expanding eastern Loudoun's trail and open space system.
3. Focus on the acquisition and development of linear parks on environmentally critical and environmentally sensitive lands.
4. Appropriate areas and standards for vista control in developing areas should be established.
5. The feasibility of developing a Landscape Ordinance for new development should be investigated.
6. Where possible, seek proffers, and where necessary, allocate County funds for the acquisition of critical scenic lands and community buffers. The following areas should be considered for such acquisition:

*(Refer to Figure 3, page 94, for general locations.)*

- a. Land for trail along Broad Run floodplain: Floodplains are often good locations for trails because they are not developable and are often of high scenic value. The Broad Run floodplain can be a critical link between the Potomac and Sterling.

- b. Open Space buffer along Route 637: needed in order to provide an open space spine through eastern Loudoun.
- c. Park site(s) on Pocahontas property: logical location for future park site in eastern area.
- d. Remainder of Vestals Gap Road right-of-way: historic road which passes through Sterling Park and the Claude Moore Conservation Education Center and Historic Farm (new Claude Moore Park).
- e. Open Space buffer north of the community of Sugarland Run: a substantial buffer is needed to protect the existing community of Sugarland Run from the proposed "loop" road.

D. Specific Community Design and Open Space Proposals:

- 1. Designate a 75' open space buffer on both sides of the W&OD Regional Trail to preserve this open space asset from development encroachment.
- 2. Link the various open space elements in eastern Loudoun through a greenbelt-linear park which would extend from the W&OD right-of-way north of the Plantation Industrial subdivision to the Claude Moore Education Center and Historic Farm and the Vestals Gap Road.
- 3. Obtain easements from property owners to conserve and develop Vestals Gap Road as a hiking trail.
- 4. Obtain easements from property owners to conserve and develop the Sugarland Run floodplain as a linear park.

## **IMPLEMENTATION**

The community design and open space policies will be implemented by three general methods. First, and most important will be the use of proffers. Described in detail on page 34, proffers are voluntary contributions of land, facilities or monetary funds made by the developer in return for rezonings granted by the County. In the case of trails, for example, the County can identify in advance the areas in which trails should be located and the developer can then make a judgement as to whether negotiations should proceed for a proffer of either land for the proposed trail or the construction of the trail. The second method will be the modification of the Zoning and Subdivision Ordinance and the development of new Ordinances for those items indicated on pages 101 et seq.

The third method for implementing community design proposals will involve the preparation of "*mini-area plans*" for large sites which are slated for development. The process of producing these development plans will consist of early discussions

between the developer and the County so that each has a clear understanding of the other's goals and objectives for the site. During this process, the County planning staff will work closely with the developer's development plan which incorporated as many of the design principles listed on page 98 et seq. as possible.

In addition to these three basic methods for implementing the design and open space recommendations, the County will seek cooperation from the VDOT when attempting to establish trails along existing roads. Trails that run parallel with and adjacent to roads are meant to serve as viable transportation facilities for pedestrians and bicyclists. It is hoped that the VDOT will cooperate with the County's efforts to establish such alternative transportation elements.

Establishing trails along stream valleys and floodplains will be accomplished by several different methods. The County can receive such lands from developers as proffers; the County can encourage the establishment of restrictive covenants on such land or the County can seek acquisition assistance from agencies such as the Northern Virginia Regional Park Authority. The NVRPA is, in fact, currently involved in a continuous program aimed at acquiring lands along the Potomac shoreline between Alexandria and Leesburg for the eventual settlement of a regional trail along the river. The County has proposed a local trail to be built through the Pocahontas (Cascades) property which will connect the Potomac and W&OD regional trails.

Each of these basic methods of implementation can be used for establishing all of the community design and open space elements of the Plan.